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UNUSUAL WEAPON =

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UNUSUAL WEAPONS OF THE THIRD REICH

Moscow

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The authors compiled an encyclopedia of unusual combat systems developed during the Second World War in Germany for aviation, ground forces and navy. The book provides brief information about the history of the development of a unique weapon, its characteristics, as well as information about the combat operations in which it was used. Extensive illustrative material will help readers get the most complete picture of the bloodiest war in the history of mankind.

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In June 1919, the Treaty of Versailles was signed, with

according to which Germany, which lost in the First World War. war, it was forbidden to develop most modern types of weapons: submarines, combat aircraft, armored vehicles, heavy artillery, chemical weapons, etc. The ban did not apply only to missile weapons, which at that time no one took seriously. nothing.

However, only three years passed, and in July 1922 the German firms Vulcan, Germany and Weser acquired the shipbuilding firm M.U. Gshrepietsgkapioog voog bsPeerzvoshi (15). This company included a design bureau, which was officially engaged in the development of new types of submarines on orders from different countries. In fact, the company was used as a front for a secret bureau for the development of the German submarine fleet. The acquisition of the company was made using the so-called “black funds”,

destined for secret use and the revival of the German armed forces. Among other, mostly innocent projects, the firm oversaw the design and construction of submarines. Three submarines for the Finnish navy (Ueleipel, Vea 5! and Ki Tigzo), built in 1930-1931. according to the project of the 1U5 company, they became the standard models of combat boats of the middle class. Tested by German crews before they were handed over to the Finns, they provided the designers with a great deal of

the amount of valuable information at a time when Germany did not have its own submarine fleet.

Initially, submarine projects were carried out as "mobilization", i.e., they were supposed to be built only if the country entered the war. The rise to power of A. Hitler spurred the German navy into a feverish but still covert expansion. The first official establishment of the submarine fleet was the School of Offensiveboowabmeitzswhe (PAZ), established in October 1933. Officially, it was considered an anti-submarine military school, but it served mainly as a planning and training center for qualified personnel for future submarine forces. In 1934, secret plans for the development of the submarine fleet had already been worked out. In accordance with these plans, 24 horseboxes (from O 1 to P 24) were ordered abroad, which at the beginning of 1935 were smuggled into Germany in disassembled form.

However, soon the need to keep secrecy from-. fell: On March 16, 1935, Hitler publicly renounced the military terms of the Treaty of Versailles. The construction of submarines now proceeded at an accelerated pace. It was even legitimized by the signing of a naval agreement between Germany and England, which allowed the Germans to have 45% of the total tonnage of the English submarine fleet.

Just like the navy, the army was rapidly increasing its weapons. In the early 30s. The Army Ordnance Department issued an order to several firms to develop tractors for agriculture. These tractors, after the Germans abandoned the articles of the Versailles Treaty, very quickly turned into modern battle tanks. The German military has always paid special attention to artillery weapons, so large forces and resources were thrown into the development of the latest models of guns and mortars. By 1939 Germany was one of the first in the world in terms of the number of artillery systems. B

In the 20s. In 1930, the German Rocket Society, which included such well-known rocket science enthusiasts as M. Walle, G. Oberth, F. Zander, and others, was actively operating.

leaflets and munitions of the arms department, led the program to create long-range missile weapons. Colonel V. Dornberger was appointed the direct person responsible for the implementation of the program. At the Kummersdorf artillery range, located a few tens of kilometers from Berlin, the construction of an army test center for liquid rockets has begun. At the end of 1934, two A2 rockets were successfully launched, and two years later, on the island of Usedom in the Baltic Sea, construction began on the state-of-the-art Nenemünde Army Test Center (Neegev Usgvispap ai Reepetiepae - NUR). Over the period from 1937 to 1940, more than 550 million marks were invested in it. In preparation for war, the Fuhrer demanded from scientists and engineers to create weapons capable of hitting long-range targets. . The air force did not lag behind the army and navy. One of the first who violated the prohibitions of the Treaty of Versailles and resumed the production of all-metal aircraft was the famous aircraft designer C. Dornier. In 1922, he began production of the large flying boat Ma! ("Kit") in Italy at the company SMAZA he created: In the 20-30s. these boats set the tone for postal and passenger traffic in Europe, the number of boats built during that period

exceeded 260 copies. In 1926, Dornier moved to Switzerland, where he founded a new company, AG fur Dornier flugzeug, and began designing the largest flying boat of that time, the 12-power Po X. In 1931, the boat Oo X made a demonstration flight on four continents. Since 1932, Dornier has been working in Germany again, heading the company Dornier Werke GmbH. With the advent of the Nazis to power, a program was adopted for the rapid revival of military aviation, but for the sake of comfort. to the world community, it was presented as a program for the production of educational, sports and small cars for civilian use. For the future air force, personnel were being trained at an accelerated pace, for example, more than 50 thousand people united within the framework of the sports aviation union. In 1934, the German Ministry of Aviation (KIM) was created, headed by G. Goering. On the militaristic orientation of the deed

The reliability of the new ministry was evidenced by at least the fact that out of seven of its departments, only one dealt with issues related to the development of civil aviation. The leadership of Germany in March 1935 officially announced the existence of the Luftwaffe. Preparing for the war, the German aviation industry increased the production of military aircraft, by the end of the first year of the existence of the Luftwaffe, the monthly production rate was up to 300
cars per month.

However, despite the obvious militarization of the German aviation industry, Western countries increased the number of contracts with German firms, which actually provided them with financial support. In the English press, for example, data were published that in 1937 the export of German aviation products to England exceeded 2.5 million pounds sterling, and for the period 1932-1937. amounted to more than 7.5 million pounds.

22. In addition to providing financial assistance, the Western countries maintained close contacts with Germany in the scientific and technical sphere. Right up to the very beginning of World War II, some prominent US scientists and engineers participated in the work of scientific and technical conferences periodically organized under the auspices of the Aviation Scientific Society. O. Lilienthal. Here is one example: at the end of 1938, in the work of one of these conferences,

- Tsiy was attended by the famous American aircraft designer I. Sikorsky, who made two reports in Berlin - "Prospects for the Development of Aviation" and "Large Flying Boat". Communication and exchange of opinions at conferences were at the highest level, because the composition of the presidium and the organizing committee of the Society. O. Lilienthal included the top management of KIM, heads of large research institutes and chief designers of German aviation firms.

At the start of World War II, the German industry produced a limited number of new weapons systems in addition to the systems in service. However, starting from 1942-1943, when, with a general change in the strategic situation, the Germans lost superiority in the air, on land and on water, the German leadership began to intensify the search for new secret weapons,

which could immediately change the course of the war. In this regard, the number of programs for the development of new models of military equipment has increased dramatically. A

This book provides the reader with a summary of the unusual combat systems developed during World War II for the German armed forces. In aviation, such systems included: missile fighter-interceptors, rammed fighters, manned projectiles, missiles, “flying wings”, asymmetric and twin-body aircraft, etc. e. In the ground forces: super-heavy armored vehicles, rocket artillery, anti-tank missiles, ultra-long-range guns, underground combat weapons, and many others. Human-guided torpedoes, ultra-small

submarines, exploding boats and new types of submarines. We also provide brief information about the history of the emergence of such weapons and the reasons for their use. Characteristics of unusual combat systems, information about the combat operations in which they were used, a large number of diagrams, drawings and photographs will help the reader to get a better idea of the bloodiest war in the history of mankind.

No. EE 112

1. TAILLESS AIRCRAFT

The appearance of tailless aircraft in Germany is directly related to the name of the scientist and aircraft designer Alexander Lippisch, who became interested in such devices even in his youth. He successively went from flying models to gliders of the Storch series, then from low-power aircraft of the Delta series to the Me 163 rocket fighter, adopted by the Luftwaffe, and the first projects of the Gi R.iZa and 11 R.13b supersonic machines. The developments of A. Lipping gave impetus to the appearance during the war of numerous projects of tailless aircraft developed by German aircraft manufacturing companies.

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C R.01-106 (top view)

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Purge Model OM

Me 163

In 1937, the Ernst Heinkel AG company, on the instructions of V.M., worked on the creation of the He 176 aircraft, in which the liquid-propellant engine (LRE) developed by the Walther company was to be used as a power plant. The lack of progress in the development of He 176 forced KIM to start parallel development and connect the BE5 glider institute represented by A. Lippisch to it. Starting work, Lippisch took as a basis the design of a tailless aircraft OE$ 39.

The choice fell on REZ 39 is not accidental. By this time, aerodynamic scientists in different countries, including Germany, where professors L. Prandtl, G. Schlichting, A. Busemann, T. Zobel and others worked, were already studying the processes of flow around the wing air at transonic and supersonic speeds. In 1935, at an aviation conference in Rome, it was noted that in order to achieve transonic speeds, it is necessary to use a swept wing to reduce the wave drag of the air caused by its compressibility. The swept wing is organically inherent in tailless aircraft due to the need to provide longitudinal balancing and controllability. Therefore, the specialists of the BEM Technical Department considered that the tailless scheme is the most preferable for the creation of a high-speed aircraft, and the merits of A. Lippisch in the field of creating tailless aircraft were undeniable. As part of the secret “Project X”, Lippisch and his collaborators were to develop the design of a new aircraft, while it was assumed that the BEZ Institute would manufacture the wing, and the Heinkel firm would build the fuselage and perform the final assembly of the machine. All further studies of Linpish were aimed at solving one problem - to develop the optimal aerodynamic configuration of a high-speed aircraft.

In 1937 comrade A. Lippisch began to develop a new aircraft "Delta UI", received in VI. M designation PE 194. Based on the scheme of the OE5 aircraft. 39, however, he abandoned the rudders located at the wingtips, and applied the central vertical
plumage in the tail section of the fuselage. Completed-

nye in 1937-1938. blowing the model aircraft in a large wind tunnel of the Aerodynamic Institute (AUA) gave good results. It was supposed to equip the car with an engine that rotated the pulling screw, the estimated speed was to be 300 km/h.

At the end of 1938, KEM, in order to speed up work and ensure secrecy, transfers “Project X” to Messerschmitt AG, assigning it the designation Me 163. A special “Department 1” is created in the design bureau of the company’s leading plant in Augsburg , where in January 1939 Linnish was transferred with his employees. Here, the development of the jet version of the Delta UT aircraft, known in the history of aviation as the Me 163, began.

In order to speed up the design of the aircraft, which was assigned the designation Me 163A, it was decided to remake the OEZ 194 under the K 1-203 rocket engine with a thrust of 300 kgf and study the flight characteristics of a tailless jet on it. The rocket engine operated on two-component fuel - T-540 (80% hydrogen peroxide with the addition of a stabilizer) and 2-50 (potassium permanganate solution). To reduce the weight of the aircraft, a ventral landing ski was provided instead of a wheeled landing gear. The first flights on the RE 194 aircraft were carried out by test pilot G. Dittmar: in August 1940, at the Rocket test site at

research center in Nenemünde. The test results were assessed positively by EE M experts, since even with such a low-power engine it was possible to reach a speed of 550 km/h, in contrast to the He 176 aircraft, which first took off on June 20, 1939, which, with an engine thrust of 400 kgf, did not was able to reach a speed of 350 km / h.

By the end of the winter of 1941, the first experimental

aircraft Me 163U1. Structurally, this machine was similar to the PE 194, but had a number of improvements. The wing (span decreased from 10.4 m to 8.85 m) with automatic front wings at the ends had a sweep along the leading edge, which changed from 27' at the root to 32 at the tips. The keel and rudder were enlarged, the kinematics of the control system were modernized, the cockpit canopy was made„more streamlined. As a power plant, a more powerful LRE V N-203V with a thrust of 750 kgf was pri- changed. The chassis was the same as the OES
194, i.e. take-off was carried out on a two-wheeled trolley that was dropped, and landing was carried out on a retractable ventral ski; in the rear fuselage there was a small supporting ski retractable in flight. In the spring of 1941, flight tests of the Me 163UI without an engine began - this practice was common for the German aircraft industry of those years. The prototype aircraft, piloted by G. Dittmar, took to the air with the help of a towing aircraft and, after uncoupling at a given altitude, made a gliding flight, the maximum speed was achieved in a dive mode. According to the results of these tests, the automatic slats were replaced with profiled slats in the toe of the wing to increase the stability of the aircraft in relation to stalling into a tailspin, and to reduce the length of the aircraft sliding along the runway. after landing, underwing landing flaps were installed.

The first flight of the Me 163U1 with the engine took place on July 13, 1941, during further tests it was possible to reach a speed of 885 km/h, it was not possible to exceed it during take-off from the ground due to the small amount of fuel. Therefore, on October 2, the car, fully filled with fuel, was raised by a towing aircraft to an altitude of about 4 thousand meters, where after uncoupling the tug and including

After the acceleration of the engine, G. Dittmar managed to reach the maximum speed of 1904 km/h, which even slightly exceeded the calculated one. R

In connection with the advent of more powerful LRE V P-211 with a banner of 1700 kgf, the interest of the VTM in the interceptor increased again, it was decided to stop further work on aircraft of the A series and start developing the Me 163V. Its prototype was the third experimental machine Me 16373, assembled in April 1942. It had a constant sweep wing along the leading edge with a span increased to 9.3 m, a longer fuselage and a pointed nose. A fairing was installed under the fuselage, where the landing ski and a small tail wheel strut were removed. The NUK 509A-1 LRE with a thrust of 1500 kt was used as an engine, later it was replaced by the NUUK: 509A-2 engine with a thrust of 1700 ktf.

The fuel composition for LRE was somewhat different: instead of the 2-80 component, C-5gov was used (a mixture of 30% hydrazine hydrate with methanol). The capacity of aircraft tanks was increased, two MK 108 guns were installed in the root part of the wing (in serial production, a certain number of aircraft were produced with MC 151 guns) and armored protection of the cockpit. Flight tests of Me 163U3 began in August 1942. At the beginning of the next year, a pre-production batch of Me 163V-0 entered the 16th test team (E.Kdo.16), based in Peenemünde. This team was engaged in the development of tactics for the combat use of missile fighters and training

aircrew for them. -

It should be said that in the summer of 1943, the Messerschmitt company, due to the massive attacks of the Allied aviation on the factories in Regensburg and Augsburg, experienced an acute shortage of production capacities necessary for the manufacture of the Me 262 fighter. Therefore, the mass production of the Me 163 was transferred to the company " Klemm, which carried out the final assembly at the plant in the Black Forest from ready-made units and assemblies obtained from small factories and workshops dispersed throughout Germany,

In July 1944, the squadron 1.26 400 began to be equipped with serial Me 163V-1a aircraft, the pilots from E.K4o.16 formed the basis of the flight crew of the brigade. task

squadron was to cover important industrial facilities from allied air raids. On July 28, 1944, eight American P-510 fighters from the 359th Fighter Group, covering B-17 bombers, collided for the first time with five Me 163 interceptors out of 1,400. In August, two squadrons of the first group, 1 AS 400 and The 2.1C 400s were assembled together at the Brandis airfield near Leipzig, each with 15 aircraft. In December 1944, the second PLO 400 troupe was formed in the 400th squadron, it was based in Stargart. The experience of combat use has shown that the Me 163V is dangerous in operation for flight and ground personnel due to extremely toxic and explosive fuel, and is extremely ineffective when intercepting. Until the end of the war, only 11 successful attacks were recorded.

In 1943 A. Lippisch moved to Vienna due to the aggravation of relations with W. Messerschmitt, where he headed the newly created research institute, but KIM retained control functions for him in the Me 163 program.

By the end of 1944, Messerschmitt had built three prototypes of the Me 163C aircraft. Machines of this series differed from the B series by a slightly enlarged fuselage, a pressurized cabin with a more streamlined canopy, and a two-chamber NUK 509S-1 LRE. However, in a series this project is not
went.

In the same year, the Me 1630 project was developed. This machine had a new, more elongated fuselage, a three-wheeled retractable landing gear, a teardrop-shaped canopy protruding above the fuselage, increased fuel tank capacities and a two-chamber NUK 509S-1 rocket engine. The first experimental machine in this series was built in the late spring of 1944 and passed flight tests in a non-engine version. However, KIM, considering that the Messerschmitt company, due to being loaded with other programs, would not have time to bring this project to mass production in time, transferred the Me 1630 project to the Junkers company. After some constructive refinement in August 1944, a prototype aircraft was built at the plant in Dessau;

received in KIM designation No. 248U1. The results of flight tests with the NUYK 509S-4 dual-mode engine showed that this machine is superior to the Me 163V in all respects. IN
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At the end of December 1944, the KSM decided to urgently start serial production of the ÿi 248, but Messerschmitt made the decision to change the designation of the aircraft to Me 263A, arguing that the main technical solutions | The machines implemented in the Design were developed by Messerschmitt. By the end of the war, not a single production Me 263A machine had been built.

At the end of 1944, a training version of the Me 1635 aircraft was developed, in which, instead of the T-VIO tank, a second cabin was installed, designed to accommodate the instructor. The engine was not installed on this machine, training flights were carried out in tow, while the remaining tanks were filled with water to maintain balance.

Serial production of the Me 163V continued until February 1945, by which time 237 machines had been built. In 1944, Japan bought licenses from Germany for the production of the Me 163B aircraft and the NUUK 509A engine, but the first experimental Japanese aircraft, designated ÿ8ÿÿ,

Me 263 17

took off only on July 7, 1945. Before the surrender of Japan, seven prototypes were built.

Characteristics Me 1638 Kote! ("Comet"): wingspan - 9.32 m, area - 19.6 m ^; aircraft length - 5.7 m; height - 2.74 m; empty weight - 1980 kg; takeoff weight - 4310 kg; maximum speed - 900 km / h; practical ceiling — 12 thousand m; time to climb C thousand m - 3 min; duration of a flight with a running engine — from 8 to 15 minutes; range - up to 100 km; armament - two guns MK 108 or MO 151 plus the possibility of installing on each console one cassette with five unguided rockets of 50 mm caliber, launched vertically upwards according to the signal of photosensitive sensors.

Characteristics Me 263A: wingspan - 9.5 m; aircraft length - 7.88 m; height - 2.7 m; empty weight - 2105 kg; . takeoff weight - 5150 kg; maximum speed - 1000 km / h; set time. altitude 15 thousand m - 3 min; flight duration © running engine - 15 min; armament - two guns MK.

ETC.

Under this designation, A. Liplish began work on a rocket fighter at the Messerschmitt firm in January 1939. By the end of 1941, several versions of the project were developed with numbers from R.01-111 to R.01-119. Lippisch assumed that the final version would receive the serial designation 11 163, but in the end they assigned the designation Me 163 to the aircraft.

R.01-111 was developed in November 1939. This variant was created for a turbojet engine, which was to be located in the rear of the fuselage. The inlet of the engine air intake was located in the forward part of the fuselage. The pilot was seated in the cockpit, the armament consisted of two 20-mm MO 151 cannons in the wing root. The takeoff of the aircraft was carried out with the help of a drop starting cart, landing - on a retractable ski under the fuselage and a small tail skid. And

Characteristics of R.01-111: wingspan - 7.5 m, area - 19 mg; aircraft length - 6.6 m; height - 3.2 m; weight

18

empty - 2200 kg; fuel supply - 2100 l; takeoff weight - 4270 kg. :

R.01-115, completed in July 1941, had two engines: the main VMM/002 turbofan engine on top in the tail section with an air intake behind the cockpit, and an additional NUK 509 LRE located under the turbofan engine. The LRE was used only during takeoff and during the pursuit of an enemy aircraft during an attack. The pilot was seated in the cockpit, the armament consisted of two MO 151 cannons in the forward fuselage. Takeoff and landing were carried out similarly to the previous project. - i

Characteristics of R.01-115: wingspan - 9 m, area - 18 m?, aircraft length - 6.75 m; height - 2.87 m.

" 6 R.01-115 19

R.01-116 was carried out in three versions, the take-off was provided with the help of a resettable launch cart and boosters, landing - on the ventral ski.

The first version, made in April 1939, had a shortened fuselage and a wide trapezoidal wing. As a power plant, it was proposed to use an IVRD in the rear fuselage, the engine intake was located in the nose. Two guns were installed under the cockpit. Ke

Characteristics R.01-116 / 1: wingspan - 6 m; aircraft length - 5.48 m; height - 2.72 m.

The second version, completed in June, had increased overall dimensions, a swept wing and a rocket engine in the rear fuselage.

Characteristics R.01-116 / P: wingspan - 9 m; aircraft length — 6.75 m; height - 3.05 m.

The third version, completed in July of the same year, had a ramjet located in the lower part of the fuselage, four guns were installed in the bow from below.

Characteristics R.01-116 / 1: wingspan - 9 m; aircraft length — 7.06 m; height - 3.05 m.

R.01-117, also completed in July, had an LRE in the rear fuselage, the pilot was lying down in the cockpit. Under the fuselage there was a landing ski, four MC guns. 151 were installed in pairs according to. both sides of the cabin

se nat network %.

B R.01-116 20

12 R.01-116 (option 3)

us. The possibility of installing two additional machine guns was envisaged. And

Characteristics R.01-117: wingspan - 9 m; length - aircraft - 7.65 m; height - 3.26 m.

Option R.01-118 was completed in August of the same year. An LRE was installed in the rear fuselage, the pilot was seated in the cockpit, two MK 108 or MS 151 guns were installed on the sides of the cockpit.

Characteristics R.01-118: wingspan - 9 m; aircraft length - 7.2 m; height - 2.96 m.

CR. 04

The project of a bomber with two engines driving pusher propellers was developed in 1939 in several versions. The R.04-106 and R.04-107a variants had a wingspan of 16.0 m and a length of 5.83 m, but the first was developed for the PB 601E engines, and the second for the less powerful Az 410 engines. The R.04-114 variant had somewhat large overall dimensions - a wingspan of 16.8 m and a length of 5.86 m.

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C R.04-114 22

C R.08 r

Project of a multi-purpose aircraft with four OB 615 engines with pusher propellers. By October 1941, the following variants had been developed:

- a long-range bomber for delivering a bomb load of 20,000 tons to a range of 15,000 km; .

- maritime patrol aircraft capable of carrying 20 thousand tons of radio-controlled glide bombs, mines or torpedoes;

- a medium bomber for delivering a bomb load of 50,000 tons to a range of 25,000 km;

- long-range reconnaissance aircraft with a range of 27 thousand km;

- a heavy transport aircraft capable of carrying a 25-ton tank or “equivalent payload” to it;

-- towing a bunch of gliders with a total flight weight of 100 thousand tons;

— a flying anti-aircraft battery with four 88-mm guns.

Characteristics of P R.08: wingspan - 50.6 m, area - 300 m2; aircraft length - 15.35 m; height - 8.6 m; fuel weight (with additional external fuel tanks): 40,000 tons, take-off weight - 90,000 tons, maximum speed at an altitude of 85,000 m - 645 km/h, maximum range - 27,150 km.

IN a i A

S R.09 -

The project of a single-seat aircraft was developed in the variants of a fighter and an attack aircraft.

In the version of the 11 R.09-1 fighter, two turbojet engines were installed in the root part of the wing, the armament consisted of four guns in the forward fuselage. A retractable two-wheeled landing gear was envisaged.

In the attack aircraft variant 11 R.09-2, an LRE was used as a power plant, the wing was straight. The fuselage had a compartment for | | tons of bomb load, two guns were installed in the bow. The take-off was carried out using a drop-down launch cart; for landing, two retractable ventral skis were used on the sides of the bomb bay and a small
tail wheel.

Characteristics 11 R.09-1: wingspan - 11.6 m; aircraft length — 7.1 m; height - 3.57 m.

Characteristics 11 R.09-2: wingspan - 10 m; aircraft length - 7.4 m; height - 3.49 m.

C R.10

The project was carried out in versions of attack aircraft and high-speed bomber.

And R.10-1 is a project of a single-seat attack aircraft with an engine that drives a pusher propeller behind the keel. There was a bomb bay in the fuselage, two nushki were installed in front on the sides of the cockpit. The retractable landing gear was three-wheeled.

11 R.10-2 - a project of a high-speed two-seat bomber with two turbojet engines in the root of the wing. The pilots were located in the cockpit side by side, the tricycle landing gear was retractable. The fuselage has a compartment for 1000 kg of bombs, two cannons were located under the cockpit for firing forward and two machine guns under the elevator one above the other for firing backwards. On

Characteristics R.10-1: wingspan - 18 m; aircraft length — 9.85 m; height - 5.95 m.

Characteristics R: 10-2: wingspan - 13.4 m; aircraft length - 8.15 m; height - 3.8 m.

LP.10 25

ETC.

In March 1943, G. Goering announced the start of a program to develop a jet attack aircraft. This program is better known as "1000-1000---1000" (delivery of 1000 kg of bomb load over a distance of 1000 km at a speed of 1000 km/h). According to the terms of reference, the aircraft was supposed to have two turbojet engines and MK 103 guns. Two projects from the Messerschmitt company participated in the competition - MP. and Me R.1108.

The I R.11 aircraft was equipped with two Lito 004V-1 turbojet engines, in addition, it was planned to install two starting

- rocket boosters in the rear fuselage, which reduced the take-off distance from 998 to 660 m. There was a compartment in the fuselage in which one could be hung. bomb 5C 1000, retractable landing gear - tricycle. The project was carried out in double and single versions. .

In the two-seater version, two MK 108 cannons were installed on the sides of the air intakes for firing forward and two MO 151 cannons in the rear fuselage for firing backwards.

C R.11-121 26

In the single-seat version, the cockpit canopy did not protrude beyond the fuselage contours; a folding horizontal tail was installed on the fin. In the normal position, the horizontal tail was folded up along the keel, and in certain flight modes it could be expanded horizontally using a hydraulic actuator. Armament consisted of two MC 151 cannons in the rear fuselage. A full-size wooden model of the aircraft was built. Work on 11 R.11 was stopped after the design of the aircraft - the flying wing H IX was declared the winner in the competition.

After moving to Vienna, A. Lippisch developed a modernized design of a single-seat variant 14 ÿ.11-121 with a delta-shaped wing of a large area in the variants of a bomber fighter and a high-altitude fighter. Armament consisted of two MK 103 guns in the forward fuselage. Fuel tanks were located in the wing consoles.

The fighter-bomber version had one keel and two Lito 004V turbojet engines located in the center section. Jet jets of the engines were screened from below by the wing, under the fuselage there was a compartment in the form of an influx, in which a 1000-kg bomb was placed. `

In the high-altitude fighter version, the aircraft had two keels and a ramjet engine (ramjet) with a flat jet nozzle. The inlet devices of the air intake were located in the leading edge of the wing, and the jet of gases flowing from the engine was shielded from below by the wing. Under the wing, landing flaps were installed, and the wingtips could turn down in flight. The main landing gear, unlike the first version, were two-wheeled. Takeoff. the aircraft was carried out using two solid-fuel launch boosters installed above the wing between the keels. After the ramjet was launched, the boosters were jettisoned under the action of the engine jet.

At the end of November 1944, the Luftwaffe high command decided on the production of the 14 R.11-121 aircraft in parallel with the No 229 (N TX) in cooperation with the Henschel company, but there is no information about the start of the construction of a prototype. ti

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C R.11-121 (option) 2

and R.11-121 (layout)

Characteristics of the single-seat version 11 R.11: wingspan - 12.65 m, area - 37.3 m; aircraft length - 8.14 m; height - 4 m; empty weight - 4005 kg; fuel weight - 1260 kg; takeoff weight - 7500 kg; maximum speed

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at an altitude of 10 thousand meters - 903 km / h; landing speed -

- 150 km / h; range at a speed of 782 km / h - 2.2 thousand km; climb time: 2 thousand m - 3.17 min; 6 thousand m - 11.0 min; 10 thousand meters - 23.9 min.

Characteristics of the fighter-bomber 11 R.11-121: wingspan - 10.6 m, area - 50 m?; aircraft length - 6.8 m; height - 2.7 m; fuel weight - 2400 kt; takeoff weight - 7260 kg; the maximum speed at an altitude of 10,000 m is 900 km/ 4; range - 3 thousand km.

C R.12

The project of a supersonic fighter with a ramjet was developed in several versions. The swept-wing versions of the fighter, which were completed by the end of 1942, were equipped with a liquid fuel engine. The engine air intake was located at the bottom in the nose of the fuselage; a retractable ventral ski was used as a landing device. Armament consisted of two MK 103 cannons on the sides of the cockpit. -

AP.12

PR.12 (option!

Later versions, the last of which are dated May 1944, were an aircraft with a delta wing with an area of 12 m?, wingtips bent downwards and frontal air intakes of various shapes. For landing, a retractable ski was installed under the fuselage. As one of the options for the power plant, it was supposed to use a ramjet engine operating on fine coal dust with a rotating disk-shaped combustion chamber.

Characteristics 11 R.12: wingspan - 11 m, area - 20 m2; aircraft length - 7 m; takeoff weight - 7260 kg; the maximum speed at an altitude of 59,000 m is 1,200 km/h; the range (with two additional external tanks) is 3,000 km.

S R.13

In 1944, work began on a project for a supersonic aircraft, which was given the designation R.13 (in 1942, this number denoted a project for a high-speed bomber with two OV 6058 engines in the forward and

thirty

C R.13 [original]

turning screws respectively). A series of blowdowns of models 11 R.13 was carried out in the AUA supersonic wind tunnel (Göttingen) at flow velocities corresponding to M=1.0–2.6. The supersonic machine was developed in two versions - 11 R.13a and M R.13b.

11 R.1Za had a thick delta wing with slerons and flaps, a large triangular keel with a rudder. The sweep along the leading edge of the wing and keel was 60. The cockpit was located in front of the keel, and the glazing of the cockpit lantern did not protrude beyond its dimensions. The power plant consisted of two engines: the main ramjet engine and the auxiliary rocket engine located in the root part of the keel above the main engine. It was planned to use finely dispersed coal dust for the ramjet instead of aviation fuel, which was in short supply at the end of the war. ÿ

The main engine was located in the center section, and its air intake protruded forward from the fuselage. The exit edges of the flat jet nozzle were connected to the control system and could deflect the engine thrust vector up or down by a certain angle. On the sides of the ramjet there were longitudinal air channels used to cool the outer sections of the wing and to displace coal dust from the fuel tanks into the combustion chamber.

After accelerating the aircraft with the help of a liquid-propellant rocket engine and reaching a certain speed, coal dust was fed into the combustion chamber of the ramjet engine through nozzles. This dust was ignited by passing through a slowly rotating cylindrical igniter grid, the rotation axis of which was perpendicular to the flow direction. The rotation of the igniter cylinder protected the grid from the formation of soot on it and, as a result, from burning through and its failure.

It was believed that a stock of coal dust of 800 kt would be

enough to ensure the flight of the aircraft for 45 minutes. The takeoff of the M R.13a was to be carried out with the help of a drop-down launch cart, landing was supposed to be carried out on a retractable ventral ski. A: PTS R.13b differed from the previous version in the presence of a two-keel plumage and side air intakes. Landing was carried out on a retractable ventral ski; for side support, wingtips bent downwards were used.

Characteristics of M R.1Za: wingspan - 6 m, area - 20 m2; aircraft length - 6.7 m; height - 3.25 m;

R.13 (option)

takeoff weight - 2295 kg; maximum speed at an altitude of 59,000 m - 1200 km / h; cruising speed - 850 km / h; armament - le guns MK 103,

Characteristics 11 R.135: wingspan - 6.9 m; aircraft length - 7.2 m; height - 2.0 m.

At the beginning of 1945, the construction of a glider under the designation OM 1 began, which was intended to study the controllability of a supersonic aircraft at low speeds and actually represented a prototype of the designed Sh R.13a. To maintain centering, the cockpit was lowered slightly and moved closer to the nose. Instead of an air intake, the RM 1 was equipped with a sharp nose cone, glazed from below to improve the pilot's view. The wing and keel with plywood sheathing had a two-spar wooden structure. The car was equipped with a three-wheeled landing gear that retracted into the wing.

During flight tests, it was supposed to raise the OM 1 on a carrier aircraft 51 204 modified for this purpose. The speed of 560 km/h was to be achieved in the mode

dives. It was planned to install a rocket engine in the future, which would allow reaching a speed of 800 km/h.

The unfinished car was seized by American troops at the end of the war. After the war, at the request of the American command, the OM 1 was completed by the Germans, after which the aircraft was transported to the USA on a specially converted C-47 aircraft. There it was carefully studied

passed flight tests, and then was transferred to the Smithsonian Institution.

In the research program of A. Lippisch, it was envisaged to build three more similar devices:

OM 2 with a turbojet engine to study the behavior of the aircraft structure at. speeds from 800 km/h to 1200 km/h;

RM 3 with a rocket engine to achieve a speed of 2,000 km/h; H

YuM 4 for conducting research at high altitudes, its characteristics are unknown.

Characteristics of OM 1: wingspan - 6 m, area - 20 m '; apparatus length - 6.325 m; height - - 3.25 m; empty weight - 297 kg; takeoff weight - 460 kg; the height of the uncoupling from the carrier aircraft is 8,000 m; maximum speed (when diving) - 560 km / h; landing speed - 72 km / h; descent speed - 6 m / s.

C R.15

The next modification of the Me 163 aircraft, equipped with the Ne5 011 turbojet engine. The design used the nose of the He 162 and the landing gear of the BE 109, the air intakes were located in the root of the wing on both sides of the cockpit. The armament consisted of two MK 108 guns in the bow. parts and pairs of MS 151 in the wing.

Characteristics 14 R.15: wingspan - 10.08 m; aircraft length - 6.4 m; maximum speed - 1000 km / h.

C R.20

The project of the upgraded version of the Me 163 with the ÿito 004ÿ turbojet engine, completed in mid-April 1943. The fuel tanks were located in the fuselage and wing. The armament, in comparison with the Me 163, was strengthened - in the wing two MK 103 cannons with 100 rounds of ammunition and in the forward fuselage two MK 108 cannons with 150 rounds of ammunition.

Characteristics and R.20: wingspan - 9.3 m, area - 17.3 m2; length - 5.73 m; height - 3.02 m; empty weight - 2419 kg; takeoff weight - 3383 kg; maximum

speed at an altitude of 8 thousand meters - 915 km / h; landing speed — 167 km/h; rate of climb near the ground - 22.8 m / s; range - 560 km; practical ceiling - 12,300 m; maximum flight time at an altitude of 6 thousand meters - 42.6 minutes; climb time: 2 thousand meters - 1.6 minutes, 6 thousand meters - 5.8 minutes, 10 thousand meters - 14.2 minutes.

A |

The Arado firm developed a design for a twin-engine night fighter and high-speed bomber with two small vertical keels on the trailing edge of the swept wing. The crew of two people was placed side by side in a pressurized cabin, two VMUU 003 turbojet engines were installed at the bottom in the rear of the fuselage and had a common air intake. Armament consisted of four MK 108 guns in the forward fuselage.

Characteristics Ag |: wingspan - 18.38 m; aircraft length - 12.95 m; maximum speed - 800 km / h at an altitude of 6 thousand meters. And

Ag E.581.4: ÿ. The project of a single-seat jet fighter with one "TRD He 011 in the lower part of the fuselage. Two small keels were installed on the trailing edge of the triangular wing from the direction of the direction. Armament consisted of two cannons MK 108 Characteristics At E.581.4: wingspan - 8 m; aircraft length - 5 .65 m; maximum speed - 854 km / h.

Ag E.581.4

Wu R.208

Blom & Foss developed a design for a single-seat Wu R.208 fighter with an engine in the rear of the fuselage that rotated the pusher propeller. The air intake with an engine cooling radiator was located under the cab. The wingtips deflected downwards had elevators and rudders. Armament consisted of three MK 108 guns in the bow. Three options have been developed:

R.208.01 with ito 222E engine;

R.208.02 with the Az 413 engine, the air intake with the radiator is moved closer to the nose, small vertical control surfaces are installed on the tips;

ÿ.208.03 with RV 603 engine.

Wu R.208.02

Wu R.208.03

Characteristics of Wu R.208: wingspan - 12.08 m, area - 13.0 m?; aircraft length - 9.2 m; height - 3.46 m; takeoff weight - 5010 kg; empty weight - 4145 kg; maximum speed at an altitude of 10,000 m — 794 km/h; rate of climb near the ground — 1550 m/min; range - 1060 km; practical ceiling - 12 thousand m.

Wu R.210 E

A project of a light fighter that participated in the competition under the “People's Fighter” program (WoShzhareg). In fact, it was a redesign of the Wu R.208 project for the VMU / 003A-1 turbojet engine, which was installed in the rear of the fuselage. For takeoff, it was supposed to use launch boosters. The main landing gear was retracted with a 90 turn into the fairing under the fuselage, the front

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the support was also retracted with a turn into a niche inside the air intake. Two guns MK 108 or MS 151 were placed in the forward fuselage.

Characteristics of the Wu R.210: wingspan - 11.52 m; aircraft length — 7.34 m.

Wu R.212

The VU R.212 project, put forward for competition within the framework of the “emergency” fighter program, was another modification of the Vu R.210, it was supposed to use the Ne5 ONA turbojet engine as an engine. Armament - two MK 108 cannons located in the forward part of the fuselage. The possibility of additional installation of two more cannons was envisaged. Three versions were considered - R.212.01, R.212.02 and R.212.03. The first version, R.212.01, had a short squat fuselage, a wing with a sweep along the leading edge of 45 and a small one. transverse "M". Two small keels were located near the wingtips. P.212.02 was a modification of the previous version with a longer fuselage and wingtips bent down with small surfaces

Wu R.212 (variant) 38

management. Four guns were installed in the forward fuselage. - <i, right>.

Third version, R.212. 03, which was put up for the competition, had an even more elongated fuselage to accommodate tanks with an increased supply of fuel. The wing had a sweep along the leading edge of 40 and a clearly defined transverse "U". At the wingtips were small keels and stabilizers with rudders. The wing structure could be made of wood, steel or aluminum alloys. The air channel of the engine inlet device served as a load-bearing element of the fuselage structure. The capacity of the fuel tanks was 2700 liters, of which 2100 liters were located in the wing and fuselage, and 600 liters were in two drop-down underwing tanks,

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which allowed to increase the duration of the flight up to four hours. Various armament options were considered: two MK 108 guns in the forward fuselage and one 5S 500 bomb under the fuselage, three MK 108 guns in the bow and 24 KAM missiles under the wing, seven MK 108 guns (three in the bow, one under the fuselage). and two in the wing consoles).

Although according to the results of the competition, the Focke-Wulf Ta 183 fighter was the winner, KIM ordered three prototypes of the Vu R.212 from Blom and Voss with the start of work in May 1945. The flight of the first experimental machine was planned for August, and the second car was supposed to be ready by September. ” However, the end of the war interrupted all work on Wu P.212.

Characteristics of Wu R.212: wingspan - 9.5 m, area - 14 m2; length - 7.56 m; height - 2.62 m; empty weight - 2659 kg;

takeoff weight - 4079 kg; maximum speed 1.4 at altitude and 7000 m - 910 km/h; cruiser- Wu R.212

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zaya - 770 km / h; takeoff distance - 840 m; landing speed — 177 km/h; 1280 m/min; range - 1125 · km; practical ceiling - rate of climb near the ground - 125,000 m.

Wu R.215

At the end of January 1944, KEM issued a specification for a night fighter, which was supposed to have four guns, a RiS 240 or EchS 244 radar, reach speeds of up to 900 km/h and stay in the air for about four hours.

When designing the aircraft, the Wu R.212 project was taken as a basis. Two He5 011 engines were located in the tail section of the fuselage, and additional vertical control surfaces were installed on the wingtips. The fuel tanks were located in the wing; a system was provided for pre-heating the fuel before it was fed into the engine. In the pressurized cabin, the pilot and the radar operator were seated on ejection seats (to the side of

the pilot) and the navigator (they lay down facing the tail of the aircraft), who simultaneously performed the functions of the arrows of the car-radio operator. It was supposed to install a fixed cannon armament in front of the cockpit in the upper part of the fuselage, and behind the cockpit one or two remotely controlled guns MO 151 on the ENI, 151 turrets for shelling the rear hemisphere. It was possible to hang two 5S 250 or 5S 500 bombs under the fuselage, as well as install 8 launchers with 56 V4M missiles. The following options for installing cannon and rocket weapons were considered:

4 cannons MK 108 (200 shells each) and 56 k4M missiles;

5 guns MK 108 (150 shells each);

2 cannons MK 112 (50 rounds each);

4 cannons MS 213 caliber 30 mm 0% shells for each) and 56 KAM missiles:

6 cannons MS 213 (160 shells per , each).

The aircraft structure is all-metal, except for the wooden control surfaces and the nose fuselage fairing. The latter circumstance was associated with the installation of the BiS 244 radar and radio equipment.

On March 20, 1945, Wu P.215 was accepted as a prototype for developing the design of a future night fighter, but the end of the war interrupted work in this direction.

Characteristics of Wu R.215: wingspan - 18.8 m; area - 63 m"; aircraft length - 11.6 m; height - 5 m; empty weight - 7400 kg; takeoff weight - 14 680 kg; fuel tank capacity — 7800 l; maximum speed at an altitude of 85,000 m - 870 km / h; rate of climb near the ground - 10 m / s; practical ceiling - 14,800 m; range - 2340 km; maximum flight duration - 5.2 hours; operating range of the OS 244 radar is from 0.2 to 50 km.

_ (BMW) UtamBotler |

The bomber project with six turbojet engines VMU 003 was developed by VMUU. The location of the engines is two under the fuselage in the bow on the sides of the cockpit and two with a common air intake in each wing console. The horizontal tail was missing. Participated in a competition as part of a program to create a long-range jet bomber. The crew of two people was housed in a pressurized cabin, in the rear fuselage there was a defensive armament of two MK 108 guns.

Characteristics Zÿgaÿÿrotbeg I: wing span - 26.5 m; aircraft length - 18.5 m; maximum speed - 820 km / h; bomb load - 4 thousand kg.

n Hee

In 1943, the aircraft designers brothers Raymar and Walter Horten began work on the creation of a supersonic aircraft. To study the controllability of a large swept wing at low speeds, they built the H Ha glider.

The design of this machine used consoles from the airframe H PE, which they had previously developed, docked to the new center section. The pilot was located in the gondola, located under the wing, with access to it through the rear fairing. This made it easier for the pilot to throw the car into service.

emergency tea. The glider was manufactured in Hersfeld in 1943, flight tests were carried out in November-December 1944. At the end of the war, the glider H XIIIa was destroyed by liberated Soviet prisoners of war.

The project of a supersonic fighter equipped with a Ne5 011 turbojet engine had the designation H HSH. In developing this aircraft, the Hortens departed from their traditional "flying wing" design and turned to a "tailless" design. The aircraft had a swept wing and a large keel, in the middle part of which the cockpit was located. The engine was installed under the fuselage. Suspension units for additional rocket boosters were provided, and three MK 213 cannons were installed as armament in the forward fuselage.

According to the idea of R. Horten, the pilot had to be placed in a special capsule filled with water in order to withstand overloads during flights at supersonic speeds. In January 1945, the construction of a prototype aircraft began, which was originally to be tested without an engine. In addition, aerodynamic tests of free-flying models were carried out in Hornberg. The almost completed experimental aircraft was destroyed by the allied forces in the spring of 1945.

Characteristics of N XIIIa: wingspan - 12 m, area - 36 m?; airframe length - 11 m; height - 1.5 m; empty weight - 250 kg; takeoff weight - 330 kg; take-off speed — 44 km/h; landing speed - 44 km / h; sink rate - 1.1 m / s.

Characteristics H x W: wingspan - 7.2 m, area - 37.8 m?; aircraft length - 7.2 m; height - 2.3 m; maximum speed (with running accelerators) - 1500 km / h; practical ceiling - 15 thousand m.

Not R.10798/1

The Heinkel firm developed a version of an all-weather single-seat tailless fighter with two Ne5 011 turbojet engines in the wing root and four MK 108 cannons in the forward fuselage. The wingtips are bent down.

Characteristics R.1079V / 1: wingspan - 13 m; aircraft length — 9 m; maximum speed - 1015 km / h.

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Not R.0798/

Not R.1080

Project of a tailless interceptor aircraft. Two Gopi-Koig ramjets were installed in the root part of the wing. There was a radar in front of the cockpit, and two MK 108 guns on the sides. The take-off was to be carried out from the ground with the help of a resettable launch cart and four outboard boosters with a thrust of 1000 kgf each, landing - on a retractable ventral ski.

Characteristics of Not R.1080: wingspan - 8.9 m; aircraft length - 8.15 m; maximum speed - 1000 km / h.

H5 R.122)

The project of a two-seat bomber with a pair of He5 011 engines located under the swept wing was developed by Henschel. The cockpit was located in the nose of the aircraft, the bomb load weighing 1500 kg was placed in a compartment in the middle part of the fuselage.

Characteristics of H $ R.122: wingspan - 21.32 m; aircraft length - 11.57 m; maximum speed - 1010 km / h.

H5 R.122 43

H5 R.135

The project of a single-seat fighter with the He5 011 engine participated in the "emergency" competition.
exterminator program. The engine was located in the fuselage, the wing tips were slightly bent upwards. Four MK 108 guns were installed under the air intake inlet.

Characteristics Hb R.135: wingspan - 9.2 m; aircraft length - 7.75 m; maximum speed - 985 km / h.

Nz R.135

ÿÿ HER 128

The project of an aircraft with a Ne5 011 turbojet engine, developed by the Junkers company, participated in the competition for the “emergency” fighter program. The engine air intakes were located on the sides of the fuselage under the wing. Small vertical keels with rudders were installed on the outer parts of the swept wooden wing, two MK 108 cannons with an ammunition load of 100 rounds each were located below in the forward fuselage, the possibility of additional installation of two more guns. The pilot's pressurized cabin had armor 12.7 mm thick at the front and 20 mm at the rear. In addition to the high-altitude fighter, variants of night and all-weather fighters with a longer fuselage and a crew of two were developed. Before the Konya war, the company built a full-size wooden mock-up of the aircraft.

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FROM HER 128. -

Characteristics of ÿi EE 128: wingspan - 8.9 m, area - 17.6 m?; aircraft length - 7.05 m; height - 2.65 m; empty weight - 2607 kg; fuel weight - 1250 kg; takeoff weight - 4077 kg; landing speed - 186 km / h; maximum speed at an altitude of 7,000 m — 990 km/h; soon the lift near the ground - 22.9 m / s; practical ceiling - 13 750 m. i

Me 265s

At the end of 1942; Lippisch, while working at the Messerschmitt firm, completed the project of the Me 265 two-seat strike aircraft, which had already begun in 1939. The machine was a tailless aircraft with two OB 603 engines that drove two pusher propellers. The lower part of the keel protected the propellers from hitting the ground during takeoff and landing. In the fuselage design, parts from the fuselage of the Me 210 aircraft were used. The armament consisted of two MC 151 cannons in the forward part of the fuselage and two MC 17 machine guns on the sides in the rear of the fuselage. The machine guns were remotely controlled by a gunner-radio operator, who was sitting in the cockpit facing the tail. The fuselage had a bomb bay. The project is not real

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Me 265

It was called because the Me 410 project, which was being developed in parallel, was accepted into the series.

Characteristics of the Me 265: wingspan - 17.4 m, area - 45 m?; aircraft length - 10 m; height - 3.8 m; empty weight - 6300 kg; takeoff weight - 11 thousand kg; maximum speed is 675 km/h.

Me 329

A modified version of the Me 265 strike aircraft, the project was carried out under the leadership of A. Lippisch. As a power plant, two YuV 603 engines were used, which rotated pusher propellers. Armament consisted of five MC 151 guns: four in the bow and one in the tail. The aircraft could carry 1000 kg of bomb load per bomb

boot bay in the middle part of the fuselage. A full-size wooden model was built.

Characteristics Me 329: wingspan - 17.5 m; aircraft length - 7.7 m; maximum speed - 740 km / h.

. Me 334

The A. Lippisch project was originally developed for a turbojet engine, then it was redesigned for a piston OV 605, which rotated a pusher screw. To protect the propeller from hitting the ground during takeoff and landing, the vertical tail was installed under the fuselage. The armament consisted of two MO 134 machine guns in the wing root. The project has not been implemented. | E

Characteristics Me 334: wingspan - 9.3 m; aircraft length - 7 m.

- Me 334

Me R.1108

The two-seat bomber project was developed in two versions.

The R.1108/1 variant had a butterfly-type tail. The cockpit was located in the forward part of the fuselage; four Ne5 011 turbojet engines installed on the trailing edge of the wing were supposed to be the power plant. The aircraft was designed for a load of up to 2500 kg.

Option P.1108 / ÿ was developed under the leadership of Lilpish. Four Ne5 011 turbojet engines were installed in the root part of the wing with air intake inlets

PE! Me R.1111

Me R.1108/I

nicks in the leading edge of the wing. The crew was located in a pressurized cabin in the forward part of the fuselage, the cargo compartment was designed for 2500 kg of bomb load.

Characteristics Me P.1108 / 1: wingspan - 20.12 m; aircraft length - 18.2. m; maximum speed - 850 km / h; range - 2 thousand km.

Characteristics Me P.1108 / 1: wingspan - 21.7 m; aircraft length - 12.5 m.

Me R.1111 ->

The project of a fighter with the Ne5 011 turbojet engine was started in January 1945. The engine air intakes were spread out in the root part of the wing. Armament - four guns MK 108 in the forward fuselage. Fuel tanks with a total capacity of 1500 liters were located in the wing. At

Characteristics Me P.1111: wingspan - 9.16 m; aircraft length — 8.92 m; maximum speed - 995 km / h.

Me R.1112/1

The design of the Me R.1112 fighter, equipped with one Ne5 011 engine, was developed in two versions. One of the options was the tailless variant R.1112/1. The air intakes of the engine were located above the wing on the sides of the fuselage, four guns - in the forward part of the fuselage.

Characteristics of Me R.1142D: wingspan - 9.15 m, area - 24 m'; aircraft length - .6.6 m; height - 2.6 m; take-off weight - 4674 kg; maximum speed - 1100 km / h.

2. FLYING WINGS

Aircraft designers from different countries were engaged in the construction of aircraft of the “flying wing” scheme and the study of their aerodynamic characteristics in the pre-war years: A. Zoldenhoff (Switzerland), A. Lippisch and the Horten brothers (Germany); V. Burnelli and D. Northrop (USA), B. Cheranovsky, V. Chizhevsky, P. Bening, A. Senkov, A. Lazarev, I. Kostenko (USSR), etc.

Despite the wide variety of aircraft of an unusual design created at that time, only in Germany the development of flying wings was brought to the stage of mass production, which was largely facilitated by the perseverance and perseverance of the aircraft designers of the Horten brothers.

WELL

In 1937, the young designers brothers Raymar and Walter Horten, having already some experience in creating gliders - flying wings N Gi N P, attempted to create their first aircraft of the "flying wing" scheme.

During the development of the NP airframe, the brothers developed a good relationship with the chemical company Dynamite AG in Troisdorf. The idea arose to use Mipolan and Astrolon composite materials produced by this company in the design of the new aircraft, which, according to the designers' intention, promised to reduce the weight and cost of the aircraft without deteriorating its strength characteristics. The new aircraft was given the designation H Ua.

It was a two-seat car with two Hirt NM 60K engines with a power of 80 hp. With. Engines (one of them

left rotation, the other - right) were installed in the wing and pushing propellers were driven through elongated shafts, the gun had to be installed between the propellers. A feature of this machine was the smaller lo-comparison with the entire wing sweep of the leading edge of the center plan. The chassis was non-retractable, tricycle. Two single-seat cabins that did not protrude from the wing were located side by side, the pilots were placed in them lying on their backs, and the view was provided through the transparent leading edge of the wing.

Initially, for the study of composites intended for use in the construction of H Ya, build or glider NoG5 deg Teshe!. This glider, which had a wing with a power set of composite materials based on phenolic resins, was tested in flight in May 1936. After completion of the flight test phase, one wing console was examined for static strength before failure, the other for half a year - for climatic effects, with special attention paid to adhesive. connections.

After testing of the experimental glider was completed in 1937, the N Ua aircraft was built, which became one of the first in the world made of composite materials. A series of test flights were performed on it, which showed good controllability. Once, during takeoff, one of the engines failed, the plane hit the ground with its wing and collapsed. After that, it was decided to make the second car out of ordinary materials (steel and wood) to speed up the second car.

The aircraft, which received the designation N Ur, had a wing span increased by 2 m and redesigned cockpits, slightly protruding from the center section, with a seated position of the pilots. The leading edge of the center section was transparent in order to provide an overview to the pilot. The designers abandoned the use of all-moving wingtips in favor of levons, installed a central landing flap and steering air brakes associated with the pedals.

The second test vehicle was presented to KIM specialists at the end of 1938 in Berlin. However, KIM did not approve the project and did not issue a contract for the development of a serial machine. In search of a source of funding to continue their work, the Hortens proposed, taking as a basis

wu design NU, develop a glider tow. However, this idea did not receive official support, after which the N Uk aircraft was mothballed.

Only in August 1941, Walter managed to enlist the support of General E. Udet. The NUB was converted at the Peshke plant in Minden into a single-seat aircraft, which received the designation N Us. This aircraft was intended for use as a night fighter. In May 1942, Walter overtook the already finished machine from Minden to Göttingen, where they underwent flight tests. In parallel with flight tests, the laboratories of the Institute of Hydroaerodynamics (Göttingen) studied the aerodynamics of the aircraft on models, but due to the negative conclusion of the scientists, the contract for the construction of a serial aircraft was not issued. TO

In the spring of 1943, N Us (tail number RE + NO) crashed: the pilot mistakenly set the flaps to the landing position on takeoff, the plane touched the roof of the hangar and crashed, but the pilot survived. Work on N U was stopped. M

Characteristics of N Ua: wingspan - 14 m, area - 34 m?; aircraft length - 5.4 m; height - 2.1 m; empty weight - 1600 kg; takeoff weight - 1840 kg; maximum speed is 280 km/h.

Characteristics of H YR: wingspan - 16 m, area - 38 m5; aircraft length - 6.75 m; height - 2.1 m; empty weight - 1360 kg; takeoff weight - 1600 kg; maximum speed — 260 km/h. A

Characteristics N Us: wingspan - 16 m, area - 36 m2; aircraft length - 6.75 m; height - 2.1 m; empty weight - 1400 kg, takeoff weight - 1600 kg; maximum speed — 260 km/h.

neither

In 1941, the Luftwaffe needed an aircraft - a flying laboratory for testing the Az 014 pulse jet engine. These engines were intended for Pÿ 103 cruise missiles and Me 328 mini-fighters. To develop a laboratory aircraft in August 1941 d. created a "team 3" (K-3). The commander of K-3 was

Captain Walter Horten, a representative of the KIM inspection department, was appointed, and Senior Lieutenant Raymar Horten was appointed his technical deputy. The headquarters of the K-3 and the design bureau were located in Göttingen. - The two-seat aircraft of the “flying wing” scheme, which received the designation N UN, was equipped with two engines. Az 10C with a capacity of 240 liters. With. The pilots were located in the cockpit sitting one after another. The center section was made of duralumin, the wing consoles were made of wood. The prototypes of the PuVRD were to be installed between two pusher propellers. The design of the propeller bushings provided for the possibility of their ejection, which was required to ensure the safety of the pilots' emergency escape from vehicles with pusher propellers. In addition to engine testing, it was planned to use the NUI to train pilots to fly tailless machines. The landing gear of the aircraft is four-post, two front wheels on separate racks retracted back, and the rear wheels forward with a turn of 90". The production of the aircraft was organized as follows: the center section was built at the Peshke plant in Minden, and the wing consoles were built in Göttingen. The first machine was fully assembled in 1942, but

jet engines Av 014 never arrived. This copy of the NUP was tested in May 1944 by Walter Horten, at the same time it was demonstrated to G. Gerint. Further tests were carried out by test pilots H. Schaidhauer and E. Ziller, and once Schaidhauer successfully landed a car in which one of the engines failed. At the end of the war, 20 N UN machines were under construction at the Peshke plant. Production aircraft were supposed to have the designation No 227 in accordance with the system adopted in Kÿ.M. aircraft length - 7.5 m; height - 2.5 m; empty weight - 1550 kg; takeoff weight - 2 thousand kg; cruising speed — 300 ky/h; maximum speed - 350 km / h.

H YHI

The project of a transport aircraft with six Av 10C engines that turned pusher propellers. Made according to the “flying wing” scheme.

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N MI (voriont)

The center section N USh was made of steel pipes, the wing consoles were made of wood, the chassis was supposed to be four-post. Landing flaps located near the center section, elevons and small air brakes on the leading edge of the wingtips were used as controls.

The payload compartment was made in two versions: in the first one, the design of the compartment was intended for the transportation of goods, in the second, the compartment was supposed to be the working part of the wind tunnel, in which it was supposed to test the models of the developed bomber N KhUSh. Tests of the prototype N USh were scheduled for November 1945, but it was not completed before the end of the war.

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NU |1945)

Already after the end of the war, by order of the command of the British Air Force, by December 1945, the Hortens developed several variants of the 70-ton H YSHI aircraft, among which were: a six-engine transport, a six-engine passenger and a four-engine passenger with coaxial propellers. „ However, none of these projects was implemented.

Characteristics of NMISH: crew of 3 people, wingspan - 40 m, area - 146 m '; aircraft length - 16.5 m; height - 3.85 m; empty weight - 5 thousand kg; fuel weight - 2760 kg; takeoff weight - 8 thousand kg; takeoff speed - 80 km / h; landing speed - 80 km / h; cruising speed — 250 km/h; maximum speed - 280 km / h; flight range — 6 thousand km; flight altitude - 1-2 thousand meters.

them -

At the end of August 1943, an order was issued by G. Goering to build two prototypes of the H EX aircraft, the project of which was the winner in the competition under the <1000--1900--1000 program. The deadlines were very tight: the first car (without engines) had to be prepared by March 1944, the second car with two VMUU 003A turbojet engines - by June of the same year. Immediately after receiving the order to build H IX, “team 3” was renamed "team 9" (K-9). Assembly of experimental machines H IX Y! and H IX U2 was carried out on the basis of a repair plant in Göttingen, in addition to this, K-9 had its branches in Hersfeld, Kirtorf, Hornberth, Aegidinberg, Tierstein, Oranienburg and Minden.

The aircraft was made according to the classic “flying wing” scheme. There was no vertical tail, the wing had one main spar and one auxiliary, to which

control surfaces were attached - elevons and flaps. In addition, there were steering air brakes (spoilers) on the wing.

Flaps were interconnected with spoilers. The course control was carried out with the help of pairs of spoilers located below and above on each console behind the main spar near the tips. Spring-loaded wiring ensured the first complete release of a small spoiler, and then a large one. Center section thickness

was sufficient to accommodate the pilot, engines and landing gear in it;

The center section of the aircraft was welded from steel pipes, the wing consoles were made of wood, the skin was made of plywood 17 mm thick. In serial production, it was planned to replace the plywood sheathing with a combined sheathing 15 mm thick. The combined sheathing had to be a three-layer composition: two outer layers of plywood 1.5 mm thick and an inner layer 12 mm thick, consisting of a mixture of sawdust and charcoal powder impregnated with glue. The charcoal was supposed to make the plane "invisible" on the radar screens. Ke

Landing gear - tricycle, retractable into the fuselage. Each console housed 4 soft engineered fuel tanks with a capacity of 3,000 liters. A suspension under the center section of two 5C 1000 bombs weighing 1000 kg each or a pair of fuel tanks of 1250 liters was envisaged. The armament of the aircraft was developed in two variants: four MK 108 cannons or two MK 108 cannons and two VV 50/18 cameras.

The first flight of the machine H IX Y! took place on March 1, 1944 in Göttingen. Approaches behind the tug He 45 were conducted by pilot H. Scheidhauer. Four days later, in the second flight (following the tug He 111), he climbed to a height of 4 thousand meters and glided to the airfield. The car demonstrated good handling. However, during landing, the braking parachute did not deploy. The pilot, unable to use the flaps for braking (they were fixed in the neutral position on the first aircraft), was forced to remove the nose wheel. The car, which received damage during the run, stopped at the very end of the runway. After the damage was eliminated, the aircraft successfully flew on March 23 and April 20, and in one of the flights, H. Scheidhauer tested a specially designed high-altitude pressure suit,

By the end of April, it became clear that the VMI engines would not be brought to the required condition for the planned first flight of the second aircraft. As a result, it was decided to install Lito 004V engines on the aircraft, which had a slightly larger diameter. The car had to be urgently redone. In order to protect the wing from the hot gases of the engines, steel sheets were used, and there was a gap of 10 mm between them and the center section.

Although the H IX U2 aircraft was still in assembly, KEM, in accordance with a special fighter program, in July 1944 issued contracts for the construction of 40 A-series aircraft to the Klemm and Gotha firms. Soon, the contract of the Klemm company, due to its workload on the Me 163B aircraft, was transferred to Gota. On October 13, 1944, representatives of Gotha and H. Brunet, who headed the group of K-9 designers attached to the company, after examining a full-size wooden model, decided to start serial production of the aircraft. Serial assembly

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But (Ca 229U3 (layout)

aircraft, designated No 229, was planned at the factory in Friedrichsrode. |

"Team 9" finished assembling the second experimental machine by the end of 1944. For the first time, H IX U2, equipped with engines, was lifted into the air by Lieutenant Erwin Ziller. This flight took place on December 18, 1944 in Oranienburg. In parallel with the tests of the N IX U2, flight tests of its systems and individual components were carried out: on the N IG glider, the center section with the nose and mock-ups of the engines of the N IX Ub machine was tested, and the N SHV and N UI gliders were used to study the control system.

The fourth flight of H IX U2 took place on February 18, 1945 in bad weather conditions (low clouds, limited visibility, wet ground). During the flight, the aircraft reached a speed of 795 km / h, but at the 45th minute the right-wing failed. engine, and Ziller went into an emergency landing. There were difficulties with the control of the aircraft! as the hydraulic pump, which rotated from the right engine, stopped. The pressure in the hydraulic system has dropped, the rudder

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jammed. Having extended the landing gear and flaps with the help of the emergency air system, the pilot noticed that the aircraft began to lose altitude sharply due to increased resistance. In order to reach the airfield, he increased the thrust of the running engine, but this led to the deviation of the aircraft from the tlissade due to asymmetric thrust. The pilot manually, making every effort, tried to hold the car. At an altitude of about 400 m, the aircraft began to roll to the right. Touching the ground, the car rolled over and caught fire, the pilot died. The total flight time of this machine was about two hours. Despite the failure with the second experimental machine, the production of the No 229 aircraft at Gota was in full swing, No 229 \ 3 (N ÿÿÿÿ) was supposed to become the prototype of a single-seat serial fighter-bomber, the No 229U6 (N ÿÿÿ6) machine - a prototype of a two-seat night fighter and a training aircraft.

On April 14, 1945, the advancing units of the 8th Corps of the 3rd US Army captured the factory in Friedrichsrod. It turned out that No 229M3 was almost finished and prepared for testing, No 229U4 and No 229U5 were not completed, and No 229U6 was in the initial stage of construction. In addition, units for 20 machines were ready. The 9th Armored Division of the US Army found N IXHUI in good condition near Leilzig, but its further fate is unknown. N THUZ (No 229U3) was later dismantled, transported to the USA and carefully studied by American aviation specialists. The aircraft was later restored and is now in the collection of the Smithsonian Institution.

An analysis of the design features of the H IX aircraft shows that the Hortens developed the world's first "invisible" aircraft, designed for covert penetration to the target. They were the first to apply the concept of Upyasifag developed at KIM, the essence of which was to reduce the radar and infrared visibility of the aircraft. The H IX radar visibility was reduced by choosing the “flying wing” scheme, the location of the engines in the center section, recessed air intakes and skin from radar absorbing materials. The reduction in IR visibility of H IX was carried out by shielding the expired

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jets coming from the engines with a “beaver tail” of the center section, as well as the use of a jet cooling system.

All these techniques almost completely coincide with the technical solutions used thirty years later in the American Stealth technology. The large-scale use of stealth technology was undertaken by Lockheed and Northrop in the 1970s and 1980s. in the E-117A strike aircraft and the B-2 strategic bomber.

Characteristics of H EXU2: wingspan - 16.8 m, area - 52.8. mi; empty weight - 4844 kg; takeoff weight - 6876 kg; maximum speed - 960 km / h.

Characteristics No 229U3 (N | HUS): wingspan - 16.8 m, area - 50.8 m ?; aircraft length - 7.45 m; height - 2.8 m; empty weight - 4600 kg; takeoff weight - 7515 kg; handling weight - 9 thousand kg; maximum speed - 945 km / h; cruising speed - 685 km / h at an altitude of 10 thousand m; rate of climb - 22 m / s; practical ceiling — 16 thousand m; flight range (with drop tanks) - 3150 km.

nx

On September 8, 1944, VTM issued technical requirements to aircraft manufacturers for the development of the Walker fighter. The Hortens, on their own initiative, submitted to the competition the Project of the aircraft, which received the designation H Kh. the course was won by the Heinkel project He 162, work on the HX project was stopped.

Characteristics H X: wingspan - 14 m; aircraft length - 7.2 m; height - 2.3 m.

| their Project for a light two-seat trainer aircraft received the designation N HP. This machine was intended for training pilots to fly: on an N UP aircraft, work was carried out on an initiative basis. The aircraft was supposed to be equipped with a RKK engine with a power of 90 hp. With. At the end

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In 1944, flight tests of the manganese were carried out in a non-engine version.

Characteristics of HCI: wingspan - 16 m, area - 38.5 m2; aircraft length - 5 m; height - 1.65 m; empty weight - 460 kg; maximum weight - 700 kg; takeoff speed - 75 km / h; landing speed - 75 km / h; cruising speed - 180 km/h; maximum speed -- 200 km/h.

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At the end of 1944, the Hortens began to work on a project for a long-range bomber of the “flying wing” type. Of the ten initial versions, the final version of the project was chosen, which was presented on February 25 to the expert commission of the ministry.

The car in many ways resembled the ÿ TXA aircraft, but had larger dimensions. As a power plant, it was supposed to use six Ito 004V turbojet engines located in the center section, the engine air intakes were located in the leading edge of the wing. The power frame of the airframe was supposed to be made of steel, and the skin was made of plywood with an intermediate layer of coal powder and a binding adhesive. This was supposed to make the bomber invisible on the radar screens.

N HOON (last version)

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To achieve the maximum range, the designers abandoned the classic landing gear: the take-off had to be carried out using a drop-down launch cart and launch pads.

accelerators. Four MK guns were planned as armament. 213 - two in the bow of the center section and two, controlled remotely, behind the cockpit. The bombs were to be placed in the center section section.

After considering the Hortenov project, the expert commission recommended installing a large keel on the wing at the rear of the center section, engines in two engine nacelles (three turbojet engines each) under the center section and a three-post retractable landing gear. In fact, the commission recommended. Horten to switch from the “flying wing” scheme to tailless. In this form (tailless bomber), the aircraft under the designation N HUSHA was recommended for construction.

However, R. Horten, dissatisfied with the commission's decision and trying to save his "proprietary" scheme of a pure "flying wing", very quickly made improvements to his original draft and again submitted it to the commission under the designation H HUSHV.

The essence of the improvements was to install two non-retractable landing gear under the center section with four wheels located one after another in each. To reduce drag after takeoff, the wheels had to be closed with streamlined flaps. Two engines were mounted on both sides of the racks. Not5 011. At the same time, the landing gear served as engine pylons and keels, which corresponded to the recommendations of the expert commission.

On March 12, 1945, the Hortens were given a contract for the construction of the H HUShV bomber, the prototype of which was to be ready by the autumn of 1945. The construction of the experimental 06 tsa began at one of the underground factories near Weimar, but was not completed before the end of the war,

Characteristics of HUPTSA: crew - 3 people; wingspan - 40 m; area - 150 m?; empty weight - 1E thousand kg; maximum weight - 32 thousand kg; fuel weight - 16 thousand kg; maximum speed — 820 km/h; cruising speed - 750 km / h; takeoff speed - 192 km / h; landing speed — 136 km/h; flight range - 6 thousand km; bomb load - 3500 kg.

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Ag E.555 2

In mid-December 1943, the Arado firm began work on a series of “flying wings” projects under the leadership of V. Laute. At the beginning of 1944, a discussion of the results of the work took place in the BIM, after which the ministry connected the Arado to the work on the long-range jet bomber program. The project received the designation Ag E.555, the company developed 15 variants of the new machine at once, seven of which were wing wings.” And

Ag-E.555-1 was a structure made of steel and aluminum alloys, carried out according to the “flying wing” scheme and had six VMU / 00ZA turbojet engines. The outer parts of the wing were slightly turned down, and two vertical keels with rudders were located on top. The glazed pressurized cabin, in which a crew of three was accommodated, protruded forward from the center section, the engines were installed above the center section in its rear part. The bomb load was placed in a compartment located in the center section. On each of the two main landing gear. there were two tandem pairs of wheels that retracted into the wing, the front two-wheeled strut was retracted to the back. During takeoff in the reloading version, an additional landing gear was used, which was dropped after takeoff. The armament of the aircraft consisted of two MK 108 cannons on the sides of the cockpit for firing forward, a turret with two cannons

Ag E.555-1 64

MS 151 behind the cockpit and a remotely controlled turret with two MO 151 guns in the rear of the center section.

Characteristics of E.555-1: wingspan - 21.2 m, area - 125 m; height - 5 m; takeoff weight - 24 thousand kg; maximum speed - 860 km / h; practical ceiling — 15 thousand m; range

(with external fuel tanks) — 4800 km; bomb load - 4 thousand kg.

Ag E.555-3 had two turbojet engines VM No. 018, located above and below the center section in its rear parts.

Characteristics of E.555-3: wingspan - 21.2 m, area - 125 m; aircraft length - 18.4 m; fuel weight - 10 thousand kg; takeoff weight - 25,200 kg; maximum speed — 915 km/h; range - 4 thousand km; bomb load - 4 thousand kg,

At E.555-6 had elongated wing panels and three VMZh 018 turbojet engines (one on top and two on the bottom of the netroplane in its rear part).

Characteristics of E.555-6: wingspan - 28.4 m, area - 160 m?; aircraft length - 12.35 m; height - 3.74 m; fuel weight - 18,750 kg; maximum speed - 920 km / h; range (with external fuel tanks) — 7500 km; bomb load - 4 thousand kg.

Ah E.555-7 is a variant of version 545-6 with two engines above the center section and one: engine under him.

Characteristics of E.555-7: wingspan - 25.2 m, area - 160 m?; aircraft length - 8.8 m; height - 3.65 m; fuel weight - 15,700 kg; takeoff weight - 41 300 kg; maximum speed — 950 km/h; range - 5 thousand km; bomb load - 4 thousand kg.

On December 28, 1944, Arado was ordered to stop work on the E.555 series and concentrate its efforts on the development and production of fighters.

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WMUU UTAMBATER AND

The VM bomber project called Zianoteg P participated in the competition as part of the program to create a long-range jet bomber. It was supposed to install two VMM 018 turbojet engines with a common air intake. The crew consisted of three people, and the scorer was located lying in the ventral armor.

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VMUU SigaÿMotbeg 17

bath fairing. In the tail part of the center section there was a remotely controlled navigator installation with two MK guns. 108.

Characteristics of ZiaBotfeg I: wingspan - 34.5 m; aircraft length - 18 m; maximum speed - 950 km / h; bomb load - 5 thousand kg. E

RI 1000-1000-1000-Bother Profeke

The Focke-Wulf company took part in the competition under the program "1600 1000 - 10005 with its project E" 1000 - 1000 - 1000-Votreg Rtojek. The project provided for the development of three versions of aircraft with two Ne5 011 turbojet engines. Option B was made according to the “flying wing” scheme, and options A and C were made according to the normal scheme. Due to the fact that the competition was won by the Horten brothers' H IX aircraft design, the Em 1000-1000-1000-Botjeg Projeki project was terminated.

Characteristics of option A: wingspan - 12.65 m, area - 27 m?; aircraft length - 14.2 m; height - 3.75 m; empty weight - 4225 kg; takeoff weight - 8100 kg; maximum speed — 1900 km/h; range - 2500 km; practical ceiling - 13,500 m, bomb load - one 5C 1000 bomb.

Characteristics of option B: wingspan - 14 m, area - 55 m * maximum weight - 8100 kg; maximum speed - 1060 km / h; range - 2500 km; practical ceiling - 14 thousand m.% E

Characteristics of option C: wingspan - 12.65 m, area - 27 m2; aircraft length - 14.2 m; height - 3.15 m; empty weight - 4225 kg; takeoff weight - 8100 kg; maximum speed — 1015 km/h; cruising speed - 960 km / h; rate of climb near the ground - 21.2 m / s; landing speed - 175-240 km/h; range when flying at an altitude of 13,600 m - 2,500 km; takeoff distance - 960 m.

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bo R.60

In January 1945, the Gotha firm proposed to BE M the project of the Po R.60 aircraft, which in many respects resembled the H IX of the Horten brothers. The main advantage of the So P.60 design was the ability to install any type of turbojet engine without reworking the entire aircraft, which was essential for. agonizing aviation industry in Germany. The Co R.60 project was developed in three versions. The aircraft was equipped with two turbojet engines located one on top of the other in the rear of the center section. On the wingtips of the machines of options A and B, a pair of small vertical control surfaces were installed above and below; on the machines of option C, vertical surfaces were installed only above the wing. -

The armament consisted of four MK 108 cannons in the center section. It also provided suspension units for launch boosters.

Characteristics of the So P.60A fighter: VMI 003A engines, wingspan - 13.5 m, area - 46.7 m}; aircraft length - 10.3 m; takeoff weight - 7450 kg; maximum speed at an altitude of 1330 m - 954 km/h; landing speed - 150 km/h, crew - 2 people, the pilots were located in the cockpit side by side in a lying position.

Characteristics of the So R.60V fighter: Ne5 011 engines, wingspan - 13.5 m, area - 54.6 m ?; aircraft length - 9.9 m; takeoff weight - 10 thousand kg; maximum speed at an altitude of 1145 m - 1005 km/h; nose speed - 153 km / h; crew - 2 people, the pilots were located in the cockpit in a sitting position in tandem.

Characteristics of the So R.60S night fighter: VMÿ 003A engines, wingspan - 13.5 m; aircraft length — 10.9 m; height - 3.48 m; crew - 3 people, the pilots were located in the cockpit sitting one after another, a radar was installed in the bow.

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Not R.1078 4 The project of a single-seat fighter with the Ne5 011 turbojet engine participated in the competition but the "emergency" fighter program was developed in three versions (A, B and C). Options B and C were carried out according to the "flying wing" scheme. He ÿ.1078ÿ had two protruding nose parts located on both sides of the air intake of the Ne5 011 engine. On the left side there was a cockpit, on the right side there was a niche of the front landing gear, retractable into the center section, and two MK guns. 108. Not R.1078C looked like option B, but had

square-section air intake, but two MK 108 guns were located on both sides of it. After the announcement at the end of February

anates

YES Not R.1078S

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1945 OKT decisions. on the concentration of efforts on the development of Ta 183 projects; ÿo EE128, Me R.1110 and Wu R.212, the Heinkel company stopped work on the project He R.1078.

Characteristics R.1078V: wingspan - 9.43 m; aircraft length - 6.04 m; height - 2.6 m; takeoff weight - 3870 kg: maximum speed - 1025 km / h; range - 1500 km; practical ceiling - 12,900 m.

Characteristics of R.1078C: wingspan - 9 m, "area schche 17.8 me; aircraft length - 6.1 m; height - 2.35 m; empty weight - 2454 kg; takeoff weight - 3920 kg; maximum speed — 1025 km/h; landing speed - 182 g rate of climb - 29.8 m/s.

On ÿ.1079/ÿ Double version of the fighter, made according to the scheme. "flying wing". The crew was located in the cockpit back to back. 2 Characteristics R.1079V/LI: wingspan - 13.13 m; length \ per aircraft - 9.48 m; maximum speed - 1015 km / h.

sh No P.1079B/II ÿÿ EE 130 -

Project of a long-range jet bomber with four VMU 003 engines mounted above the rear part of the center section. The entire structure was metal, with the exception of the wooden outer sections of the wing. A glazed cockpit for two or three people occupied the entire forward fuselage.

Characteristics of ÿi EE 130: wingspan - 24 m; aircraft length — 11 m; maximum speed - 990 km / h; bomb load - 3 thousand kg.

p 3. AIRCRAFT WITH REVERSE WINGS

In the prewar years, aerodynamic scientists in different countries were already studying the influence of the wing shape on the processes of air flow around it at speeds approaching transonic. Studies in models with different wing shapes have shown that a swept-back wing (RSW) has a more favorable distribution of circulation over the span compared to a straight wing and a normal-swept wing. In addition, it was found that, with an increase in elongation, the aerodynamic load in the end sections of the KOS decreases. And, as a consequence of the results obtained, aircraft designers began to be interested in the swept back wing.

Particularly intensive studies of devices with CBS. at that time, Soviet aircraft designers were engaged. The first of them was Professor V.N. Belyaev, who in 1933-1936. created two experimental gliders — a single-seat BI-2 (TsAGI-2) and a two-seat BP-3. The BP-2 glider participated in the IX glider rally in Koktebel, and the BP-3 was even built in a small series. In 1935 M.A. Kuzakov creates a single-seat training glider MAK-8 of the same aerodynamic design, and a year later V.I. Emelyanov created two-seater gliders KIM-2 and Stakhanovets. In 1938-1940. V.N. Belyaev, using the data obtained during the tests of his gliders, assembles a twin-engine bomber DB-LK. The machine passed state tests, during which 102 flights were performed, and became the first aircraft in the world to successfully fly from SOS. The commission ordered to eliminate the problems identified during the tests.

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wealth (one of which was poor visibility for the pilot and navigator) and submit the modified car for repeated state tests. However, it was not possible to finalize the machine, since with the beginning of the war, work on the DB-LK was stopped by order, and all efforts were focused on the serial production of the Il-4 aircraft.

In 1937-1939. In Germany, A. Lipchish, within the framework of the secret “Project X”, under which a high-speed rocket fighter was developed, conducted research to find its optimal aerodynamic configuration. He created three aircraft: with different wing shapes: a tailless aircraft OEZ 39 (“Delta GUS”) with a normal sweep wing, a “flying wing” PE $ 40 (“Delta U”) with a normal sweep and a glider OE $ 42 Kogtogap with KOS. Comparing the results of flight tests of these devices, Lippi chose a normal-swept wing for the developed aircraft, which later received the serial designation Me 163. Although the reverse-swept wing was rejected by Lippisch when creating his aircraft, other German aircraft designers during World War II quite often turned to this aerodynamic layout.

2 VMUU 5sponder 11 The BMW firm developed a project for a high-speed bomber with a reverse-swept wing and two theater engines. VMI 028 with coaxial screws. The engines were mounted above the fuselage on pylons. The crew of two people

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roamed in a pressurized cabin in the forward part of the fuselage, defensive armament consisted of two fixed cannons firing backwards.

Characteristics of the blunt 11: wingspan - 35.7 m; aircraft length - 21.5 m; ei

Wu R.209.

By the end of 1944, the command. The REW came to the conclusion that a high-altitude fighter with a Me5 011 turbojet engine was needed. The development of such a fighter was announced as part of an “emergency” fighter program. By February 1945, three proposals had been received from Messerschmitt, two each from Focke-Wulf and Blom and Foss (Wu R. 209 and Wu R. 212) or one from Heinkel and Junkers.

The project of a single-seat aircraft Wu R.209, submitted for the competition, was developed in two versions - R.209.01 and R.209.02. The Ne5 011 turbojet engine was installed in the rear of the aircraft fuselage, the cockpit was located above the air intake channel. Main landing gear

retracted forward into the lower part of the fuselage, and the front support - back into the nose of the fuselage with a slight mixing to the right (the air intake inlet was slightly shifted to the left). -

The R.209.01 variant had a normal swept wing, on its tips there were small control surfaces deflected downwards, two MK guns were mounted in the forward part of the fuselage from below. 108. Option R.209.02 had wings. swept back, armament consisted of three MK 108 guns.

Characteristics of Wu R.209.01: wingspan - 10.65 m; length - -

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on an airplane - 7.3 m; maximum speed - 900 km / h.

Characteristics of Wu R.209.02: wingspan - 8.1 m, area - 14 m?; aircraft length - 9.2 m; height - 3.38 m; empty weight - 2674 kg; takeoff weight - 4094 kg; maximum - speed at

altitude 9 thousand m - 988 km / h; rate of climb near the ground - 1545 m / min; range - 1025 km; practical ceiling — 12,100 m.

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In 1942, the Focke-Wulf firm began to develop a series of projects for a light single-seat fighter with a Jito 004B turbojet engine. According to one of the projects, E» Jareg R.I was developed, which had a reverse wing

Eat Yodeg RI

sweep, Y-tail and an engine located on top of the fuselage behind the cockpit. The armament consisted of two 30 mm MK 108 cannons and two 20 mm caliber MC 151 cannons in the forward fuselage. However, the project was not further developed. Characteristics Em Javeg R.1: wingspan - 8.2 m; aircraft length — 10.5 m; maximum speed - 930 km / h.

Not 1626

The project of the He 162C aircraft was a further development of the A series aircraft, but with the Ne5 011 turbojet engine, it participated in the competition of projects for the "emergency" fighter program. It was developed in two versions: one with a normal sweep wing, the other with a reverse sweep wing.

Characteristics of He 162C: wingspan - 9 m; aircraft length - 9.25 m; maximum speed - 1010 km / h; range - 1000 km; armament - two guns MK 108.

ÿi 287 and At the end of 1942, V.M. considered that the Vu 250 and Me 264, which were developed as AtepKa-Voteg, were obsolete. A technical task was issued for the development of a long-range jet bomber equipped with a Zipyu 004V turbojet engine and capable of carrying 4,000 kg of bombs at a distance of up to 7,000 km with a maximum speed of 900 km/h. Junkers was involved in this development, which began in the summer of 1943 the design of a bomber under the designation ÿi 287. performance compared to the `forward-swept wing. However, the negative features of such a scheme were also revealed: at high speeds, divergence of the wing occurred, which could eventually lead to its destruction. Moreover, during the design process, it turned out that the expected characteristics of the new aircraft were significantly lower than those required: it could carry a bomb

load weighing only about 3 thousand kg for a range of only 2 thousand km.

To reduce the construction time of the experimental machine, which was supposed to study the effect of various flight modes on the aerodynamic characteristics of the negative sweep wing, the company's specialists used ready-made parts and assemblies from serial aircraft. The fuselage was taken from He 177A3, the tail unit - from ÿi 188, the nose two-wheeled landing gear - from the captured American B-24 bomber, the wheels of the main landing gear - from ÿi 352. on the sides in the forward part of the fuselage and two under the wing, under the engine nacelles, starting accelerators were hung. The first flight of the experimental aircraft Ju 287U1 took place on August 16, 1944. The results of flight tests, during which the maximum speed of 650 km/h (dive mode) was reached, formed the basis for improvements during the construction of the second experimental aircraft.

While the flight tests of the first experimental machine were going on, in the fall G. Goering issued an order © to suspend work on the JA 287. At the meeting that took place after that, the status of work on the JA 287 and its competitor, the Arado project Ag E.555, was discussed. As a result of three days

During the discussion, the unsatisfactory state of affairs with the development of long-range bombers was noted. The representatives of the firms present at the meeting were ordered to submit their proposals on this issue by March 1945.

In December 1944, the Arado firm stopped work on the Ag E.555 project, and the Junkers firm at the beginning of March of the following year presented a modified second experimental machine No. wing (three in a full bunch) as a prototype of the A-! series. The design speed was 800 km/h, the bomb load was 4,000 kg, and the takeoff weight was 21,200 kg. On machines of the V-i series, it was supposed to install four Ne5 011 turbojet engines under the wing, on machines of the V-2 series, two VMU 018 turbojet engines. However, as a result of the discussion, the contract for the construction of a long-range bomber was given to the Horten brothers, the authors of the N XUSH project.

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Shortly before the end of the war, during the bombing of the Junkers plant by Allied aviation, the first experimental aircraft was damaged, and the unfinished second aircraft L 28712 was captured by Soviet troops. This aircraft became the prototype for the experienced bomber EE-131, developed by order of the Soviet command in. OKB-1 in Dessau (Germany). The estimated range of the bomber was 1050 km, the bomb load was 2,000 kg. A twin tail machine gun mount of 13 mm caliber was envisaged as a defensive armament. The built prototype EE-131, which included some units removed from Li 2872, was transported to the Soviet Union in September 1946. The first flight of the experimental machine took place on May 23, 1947. The second prototype machine was under construction from the beginning of the same year, but at the end of the year, work on it was stopped. The EE-131 program was completely terminated in the middle of 1948, and the Design Bureau -! switched to the development of the EE-140 bomber.

The new aircraft was a modification of the EE-131, in which, instead of six engines, two more powerful A.A. engines were installed under the wing. Mikulin AM-TRDK-01, twin cannon turrets were installed above and below the fuselage for firing backwards and cockpit armor was introduced

Io 287 UI 78

skilage. The bomb load was increased to 4500 kg.

The first flight of EE-HO (it was a converted second machine EE-131) took place on September 30, 1948.

In our tests, the maximum speed was reached

904 km / h and a flight range of 2 thousand km. However, at the highest

level, it was decided to remake the aircraft in a vari

reconnaissance ant with an estimated range of 3600 km. To achieve

range reduction engines AM-TRDK-01 replacement

nili on more economical VK-1 engines, but at the end. wings installed additional fuel tanks. In ne

forward part of the cargo compartment and in the tail section of the fuse

lyazha installed equipment for conducting day and night

photo reconnaissance. The first flight of an experimental machine, semi-

which had the designation "140-R", took place on October 12, 1949; however, was soon interrupted due to the onset of vibration

wing. Further modifications of the aircraft in order to eliminate

vibration of the wing did not give positive results,

That's why. in July 1950, work on the 140-R aircraft was

terminated. Parallels were painted at the same time

but the ongoing work on the modification of "140B / R", which

which was intended to be used both as a

spy and bomber.

The experience of operating the above aircraft has shown that in order to eliminate the aeroelastic divergence of an all-metal reverse-swept wing, it must be made more rigid, which inevitably led to

` overweighting of the structure. Therefore, KOS remained unclaimed for a long time in the development of fighters and bombers.

Characteristics of ÿi 287U1: wingspan - 20.1 m, area - 61 m; aircraft length - 18.3 m; height - 3.38 m; empty weight - 12,500 kg; takeoff weight - 20 thousand kg; maximum speed — 555 km/h at an altitude of 6,000 m; cruising speed — 510 km/h at an altitude of 7,000 m.

4. ASYMMETRIC AIRCRAFT

Wu 141

Design of a three-seat multi-purpose aircraft. (reconnaissance, bomber, attack aircraft) began in 1937, the first prototype took off on February 25 of the following year. A feature of this machine was the asymmetric design: the fuselage with the VMUU 132M engine and tail fins was located on the left, on the right was the gondola with the cockpit and small arms. It was thought that the asymmetrical layout would improve visibility for the crew. E

After tests of five pre-series copies of the Vu 141A built on the order of KIM in April 1940, serial production was postponed by the decision of the Ministry. However, the company continued to work by installing a more powerful VMUU 801A engine, increasing the wingspan, redesigning the empennage, landing gear and control system. The first flight of the B series aircraft took place on January 9, 1941. By order of the Ministry, the company built five pre-production aircraft, but in the spring of 1942 the program was closed.

Characteristics of Vu 141A: wingspan - 15.5 m, area - 41.5 m?; aircraft length - 12.15 m; height - 4.1 m; empty weight - 3170 kg; takeoff weight - 3900 kg; maximum speed at an altitude of 3800 m - 397 km/h; cruising speed — 363 km/h; range - 1123 km; practical ceiling — 9 thousand m; armament - 2 fixed MC 17 machine guns in front, 2 MO 15 machine guns on a mobile mount at the rear and four bombs weighing less than 50 kg.

Characteristics of Vu 141V: wingspan - 17.45 m, area - 51 m?; aircraft length - 13.95 m; height - 3.6 m;

empty weight - 4700 kg; takeoff weight - 5700 kt; maximum speed at an altitude of 5,000 m is 435 km/h; range - 1888 km; practical ceiling - 10 thousand m; armament is similar to the machines of the A series.

Wu R.178 a

The project of a single-seat asymmetric dive bomber with a ÿito 0048 engine located to the right of the fuselage. Behind the cockpit there was a fuel tank, and behind it was a bomb bay for a 5C 500 bomb. There was an air brake in the tail section, the armament consisted of two MS 151 guns in the forward fuselage. The option of suspension under the fuselage of one bomb 5C 1000 was considered, as well as the option of using a solid

shower boosters in the rear fuselage during takeoff in an overloaded version or when the aircraft exits a dive.

Characteristics of Wu R.178: wingspan - 12 m; aircraft length - 10.8 m.

Wu R.178

Wu R.179

A project of a single-seat asymmetric fighter-bomber with a VM\801 engine. The cockpit was located in a separate gondola to the right of the fuselage.

The main landing gear retracted towards the wingtips. The armament consisted of two MC 151 cannons, located in the lower part of the cockpit, under the cockpit a suspension of one 5C 500 bomb was provided.

Characteristics of Wu R.179: wingspan - 10.39 m; aircraft length — 8.43 m; maximum speed - 600 km / h.

| Wu R.179 82

Wu R.194 V

The project of an asymmetric aircraft was developed in the variants of a dive bomber, attack aircraft, heavy fighter and reconnaissance aircraft. In the forward part of the main fuselage there was a VMUU 801R engine with a pulling propeller and a bomb bay in the middle part. In the right. a short fuselage 6.4 m long contained a pilot's cockpit armored with steel sheets and a Zato 004V or VMUU 003A turbojet engine, the air intake of which was located under the cockpit. Fuel tanks were located in the wing. Three-rack landing gear was mounted on the main fuselage; the main struts were retracted into the wing, the tail wheel into the fuselage. Armament - 2 cannons MK 103 (140 rounds each) and 2 cannons MO 151 (200 rounds each) on the sides of the cabin, the bomb load was taken in the following variants: 9 bombs 5ÿ 70, 2 bombs 5ÿ 250, 1 bomb 5ÿ 500 or 1 bomb - ba 5S 1000.

Characteristics that are the same for all variants of the aircraft: empty weight - 6500 kg; takeoff weight - 9350 kg; wing area - 36.4 m?; aircraft height (except version 01-02) — 3.92 m; top speed at altitude

Wu R.194.01 yes

5. TWIN-BODY AIRCRAFT

Ag E.530

Arado offered KEM a fast, long-range twin-body bomber powered by two OB 603C engines. The pressurized cockpit was located in the left fuselage, and the fuel tanks were located in the right fuselage. One bomb weighing 500 kg was suspended under the central section of the wing. Since, in terms of its characteristics, the Ag E.530 did not exceed the twin-body aircraft of the Messerschmitt, the work on the project was terminated.

Characteristics Ag E.530: wingspan - 16.3 m; length — 14.2 m; takeoff weight - 10 400 kg; maximum speed - 723 km/h; range - 1800 km.

Ag E.530 86

Not 1112

During the development of the heavy gliders Me 321 and Li 322, the problem arose of choosing an appropriate tug for them. The commonly used method of towing with three BE 110C-I fighters, the so-called ioi Ka-ssscherr, was too dangerous for this purpose, and aircraft of the J and 90 type lacked the power required for the task. In 1941, two prototypes of the He 1112 twin-fuselage aircraft were built (2%1-Shu - "twins"). Two He 111 H-6 bombers were connected by a middle wing compartment, on which three engines were installed (the total number of engines was five Lito 211E-2/5-2). After testing. prototypes at the end of 1941, the power structure of He 1112 was strengthened. During takeoff, two boosters with a thrust of 500 kg each, installed under each fuselage, and two boosters with a thrust of 1,500 kg each under the middle wing compartment (on both sides of the middle engine) were additionally used. The towing cable for the Me 321 glider was divided and fastened in the root parts of the central wing compartment, connecting between the tail stabilizers into a single cable with a diameter of 16 mm. Smaller gliders (Co 242 type) could be towed in pairs on independent cables attached to each He 1117 fuselage. During the test flights, three small gliders were towed simultaneously,

The production of He 1112 was launched at the beginning of 1942, and by the end of the same year the first machines were put into operation. Only the prototypes and a few first machines used the fuselages of serial He 111N-6, all subsequent machines were based on the He 111N-16. The crew of Not 1117 consisted of seven people. In the left fuselage were the crew commander, radio operator, gunner and mechanic, in the right - the co-pilot (aka navigator), gunner and mechanic. The armament consisted of a 20-mm MS EE cannon in the forward part of the right fuselage and a MO 15 machine gun in the forward part of the left fuselage. In addition, each fuselage had one MO 131 machine gun on top and one MO 15 machine gun in the tail part from below. Other armament options were also tested, including four MC 131s, two twin MC 917 machine gun mounts, and five MC 81/7 cannons.

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Of the twelve He 1112 tugs built, eight were lost during operation, shot down by enemy fighters or destroyed during bombing. The remaining four vehicles were probably destroyed after the surrender of Germany.

Characteristics of He 1117: wingspan - 35.4 m, area - 148 m?; length - 16.4 m; the distance between the axes of the fuselages - 12.8 m; empty weight - 21,500 kg; takeoff weight - 28 600 kg; maximum speed - 435 km / h; towing speed — 250 km/h (2 So 242 gliders) and 220 km/h (1 Me 321 glider); practical ceiling - 10 thousand m, cruising altitude - 5800

m.

635 In the middle of 1944, the Junkers firm was involved in work on the creation of a two-body aircraft, the Po 3357 long-range reconnaissance aircraft, which was jointly carried out by the Dornier and Heinkel firms. To speed up the development time, Junkers proposed as a basis its old project 1075.01-21/\\ 00304 with the corresponding modification (installation of new wheels of the main landing gear, increase in the length of the fuselage, dimensions of the central section of the roof

la, etc.). After reviewing proposals for improvement, the EM approved the proposed project and assigned it the serial designation Ja 635. The company received a contract for four prototypes and six pre-production machines. And ÿi 635 used two modified fuselages from Po 335, connected by a wing center section of a constant chord. Detachable wing panels tapered
back, under two E200-l drop tanks could be suspended from them to increase the range
flight. The power plant consisted of four OV 603E-1 engines, one located in the nose and tail parts of each fuselage. Fuel was to be placed in ten inner wing and four fuselage tanks. Two Kb 50/30 cameras were placed in the left fuselage compartment, and five 60-kg signal bombs were placed in the right fuselage compartment. The crew of four was located in the aircraft as follows: the commander and radio operator were in the left fuselage, and the co-pilot and navigator were in the right. The chassis should have

consist of two nose struts ,under the nose of each fuselage, two main struts and a removable additional strut under the middle section of the wing. When the aircraft took off, it was planned to use launch accelerators. The reconnaissance aircraft was supposed to be equipped with radars, small arms were not provided.

By the beginning of 1945, aerodynamic tests of the models were carried out, and a wooden model of the aircraft was also built. However, on February 5, all work on ÿi 635 was terminated. .

Characteristics of ÿi 635: wingspan - 27.5 m; length --

. 18.5 m; maximum speed - 720 km / h.

Me 1097

In 1942, KIM issued a contract to Messerschmitt for the development of a twin-body aircraft Me 1097, which was two serial BE 109 fighters connected by a central wing section and a horizontal tail section. The project was developed in the following versions:

Me 1092-1 (prototype) from two V? 109E-4 with OV 601E-1 engines and without weapons;

Me 1092-2 Votfeg from two BE 1096-6 with OV 605A-1 engines, armament - 2 MK 108 guns, 2 MK 103 guns - and 1 5C 500 bomb;

Me 1092-3 ?egvÿoteg of two BE 109N-2 with Lito 213E engines, armament - 4 guns MK 108, | cannon MK 103 and 1 bomb 5C 500;

Me 1092-4 Votfeg from two BE 109 N-2 with Lipo 213E engines, armament - 2 MK 108 guns and 2 5C 1000 bombs.

The cockpit was located in the left fuselage, the outer main landing gear retracted outward in the wing console, and the inner main landing gear - inside the central section of the wing.

The prototype, built in early 1943, was destroyed during an allied bomber raid on the firm's flight test facility. In 1944, after the adoption of the Me 262 jet fighter, the Me 1092 program was painted over,

Characteristics Me 1092-1: wingspan - 13.27 m; aircraft length - 9.05 m; height - 2.69 m; empty weight - 6 thousand kg; takeoff weight - 7280 kg; maximum speed at an altitude of 8 thousand m - 743 km / h; cruising speed - 570 km / h: service ceiling - 11,700 m.

Me 609

The design of the aircraft, made up of two Me 309s, was developed in the variants of a heavy fighter and a high-speed bomber. The cockpit was located in the left fuselage. The armament in the fighter version consisted of four cannons (two MK 108 and two MK 103) and one ZS 500 bomb or two ZS 250 bombs under the central section of the wing, in the bomber version - from one MK 108 cannon and one 5S 1000 bomb each under each fuselage. Razra-

- the aircraft's side was repainted in 1944. Characteristics of the Me 609: wingspan - 15.75 m; aircraft length - 9.72 m; height - 3.43 m; empty weight - 5247 kg; 7 takeoff weight - 6534 kg; maximum speed - 760 km / h.

6. ROCKET INTERCEPTERS

The first projects of rocket interceptor aircraft were presented at KIM in 1939-1940. W. von Braun and E. Bachem. However, since at the beginning of the war the German aviation owned the initiative and had air superiority, the VGM rejected these projects. But from January 1943, in addition to night bombing, Allied aviation began to use massive daytime bombing strikes against targets located on German territory. It became obvious that the Me 109 and Ru 190 fighters were unable to effectively intercept allied bombers. The fact is that units, for example, American B-17 bombers, in order to maximize mutual support of their aircraft with small arms fire, used a close formation, known as a “combat box”. Therefore, German fighters, which did not have a special superiority in speed and at the same time had rather large frontal sections of propeller engines, were a good target for gunners of B-17 aircraft, even at a distance of more. 1000 m

_ BEM specialists came to the conclusion that it was necessary to develop new fighters small sizes, which could develop high speeds during the attack. The appearance by that time of mass-produced rocket engines with acceptable performance characteristics, as well as the existing experience in the development of the first He 176 and Me 163 rocket aircraft, became the basis for the adoption of Kÿ.M in early 1944 of the program for the development of small object rocket fighters (launched from the ground or launched from a carrier aircraft), the only

on

the significance of which was to intercept bombers of the allied forces. The probability of massive losses of these mini-interceptors during combat operations was estimated by experts as very high, therefore, the technical requirements issued by the KM in the late spring of 1944 provided for the maximum simplification of the aircraft design, the use of the cheapest materials and unskilled - bathroom labor force during assembly. However, at the same time, special attention was paid to the problems of increasing the survivability of the aircraft and the survivability of the pilot.

The projects developed by German aviation firms were divided into three groups that implemented different concepts for delivering an interceptor to a combat zone:

the first group included interceptors that were delivered to the combat zone with the help of a carrier aircraft;

the second group consisted of Me 163 tin interceptors, i.e., independently taking off from the home airfield

ÿand reaching the combat zone under their own power; the third group - interceptors that took off from a ground-based launcher and then carried out an independent flight.

arynyn W. von Braun |

On July 6, 1939, Wernher von Braun submitted to Goering "Proposals for the development of a fighter with a rocket inflator." In these proposals, he argued the advantages of an interceptor aircraft with a vertical launch over the Me 163 rocket fighter with a horizontal launch, developed since 1939 as part of the “X Program” under the leadership of A. Lippisch. In addition to A. Lippisch, the Junkers Firm and E. Bachem from the Fieseler firm worked on the projects of their interceptors.

It must be said that von Braun was not a novice in aviation: in September 1933 he received a pilot's license, by the beginning of 1942 his total flight time was 472 hours. And in the spring of the next goal, after a series of unsuccessful attempts, one of the experimental Heinkel He 112 aircraft took off.

Sony 92 | A

For the fishing installation, it used a conventional piston engine in the bow and an additional rocket engine in the rear fuselage. The LRE was developed under the leadership of von Braun; alcohol and liquid oxygen were used as fuel components.

The missile interceptor proposed by von Braun had a cigar-shaped fuselage, a wing span of 8.5 m with a slight sweep along the leading edge, and a conventional tail unit. In front of the fuselage there was a small airtight cockpit, in which the pilot was seated (in level flight mode). For viewing in the cockpit, there was a non-glazed front glazing, for navigation at night it was supposed to install a moving map type device in the cockpit with an indication of the current position of the aircraft. Behind the cockpit were tanks with fuel components - alcohol and liquid oxygen, the fillers were located on top of the fuselage. A two-chamber liquid-propellant rocket engine was located in the tail section of the fuselage, gas rudders were used at the exit of the main nozzle, which were used to control at low speeds during takeoff. A retractable ventral ski was used as a landing device. The armament consisted of four cannons in the root part of the wing, two on each side. The thrust of the rocket engine during takeoff was. 10 160 kgf, and in level flight - 771 kgf. E

The interceptor had to take off vertically from a stationary starting position. At the climb stage, the aircraft had to be controlled automatically. The maximum climb height was 8,000 m, and the rate of climb by this moment was 151 m/s. After reaching a predetermined altitude, the pilot took control and carried out a horizontal flight, the maximum speed of which was 700 km/h. Targeting was supposed to be carried out from the ground. After hovering, the aircraft had to go in gliding mode to the nearest airfield, landing was carried out with the help of an extended ventral ski. The estimated flight time was 15 minutes.

Pre-launch preparation took place in the hangar. It housed two dozen aircraft at once, with each interceptor positioned vertically, supported by a conso

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wing slats on horizontal parallel rails, and the tail section on a four-wheeled bogie. Along the rails, the aircraft, together with the trolley, moved to the launch pad, from which a vertical take-off was carried out. Next to the hangar there was a flight control command post and a radar station. However, von Braun's idea did not receive support in KEM. The main disadvantages, according to the specialists of the KI/M Technical Department, were the high cost of facilities and equipment of the complex, the vulnerability of the launch complex, and the need to refuel the aircraft with fuel components immediately before launch (liquid oxygen quickly evaporates after refueling).

Interceptor characteristics: wingspan - 8.5 m; aircraft length - 9.3 m; height - 3.02 m; take-off weight - 5 thousand kg, horizontal flight speed - 700 km / h; rate of climb - 151

m/s; practical ceiling - 8 thousand meters, flight time - 15 minutes.

In the spring of 1941, von Braun (by this time he had already been awarded the rank of SS-Sturmbannführer) proposed a second version of his interceptor, replacing the stationary launch position with a mobile launcher. The aircraft was generally similar to the first version, but had some differences: the keel and rudder had a smaller horse, the glass area was increased to improve the pilot's view, the wing began to have a small transverse W. In addition, the developers switched on a different composition of fuel components - Yisoi (vinyl isobutyl ether) and 5U-5(0# (a mixture of 90% nitric acid and 10% sulfuric acid). vertically between the tractor and the trailer, leaning by the wings on the truss struts fixed on the tractor and the trailer, while the tail section of the aircraft relied on a four-wheeled cart.But this proposal of V. von Braun was also rejected.

Characteristics of the second version of the interceptor: wingspan - 8.6 m; aircraft length - 9.3 m; height - 3.2 m; takeoff weight - 5080 kg; horizontal flight speed — 690 km/h; rate of climb - 143 m / s; practical ceiling - 8 thousand m, flight time - 15 minutes.

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Jo EE 009 y -

In 1939, the Junkers firm developed a project for the Ja EE 009 Nshareg ("Vertical Fighter") interceptor, taking off from an inclined mobile launcher. A bunch of engines was located in the front of the fuselage: the first option provided for the installation of ten low-power Ne5 6 TRDs - six above and four below the cockpit, the second option provided for the installation of four Ne5 6 TRDs under the cockpit and six pulsating jet engines above the cockpit. During takeoff, launch rocket boosters were used, and a ventral ski was provided for landing. The pilot in the cabins was located lying down, two MK guns. 108 were on the sides of the cockpit. The fuel supply was only enough for a few minutes of flight. The project was not further developed.

Characteristics J and EE-009: wingspan - 4 m; aircraft length - 5 m; takeoff weight - 2 thousand kg; landing speed — 160 km/h; maximum speed - 905 km / h; rate of climb — 77 m/s; practical ceiling - 15,700 m.

Ja EP 009 95

Ei 166

In 1940, the technical director of the Fieseler company, Erich Bachem, developed his own project of the vertically launched interceptor Ei 166 in 1940, similar to the design of W. von Braun, in two versions.

The first variant (Hopejaweg 1) was a combination of a rocket with a liquid-propellant rocket engine and an interceptor aircraft with two Ito 004 turbojet engines installed in the wing, the so-called "horse and rider" system. With the help of the raksta, the plane rose to an altitude of about 12 hys. m, then the rocket was dropped, and the aircraft switched to horizontal flight mode. The dropped rocket was parachuted to the ground, after which it could be reused. The interceptor landed on a half-fuselage ski. The armament consisted of two cannons placed in the wing roots.

The second variant (Nosepjareg 11) was a two-seat aircraft with a liquid-propellant rocket engine located in the tail hour.

of the fuselage, the landing of the machine was carried out in a gliding mode on the ventral ski.

Characteristics Nozheljaveg |: take-off weight of the system - 19 thousand kg; flight weight of the aircraft - 5620 kg; maximum speed - 830 km / h; flight duration - 45 min.

Characteristics of Nozhepharet 11: take-off weight - 13,500 kg; maximum speed - 830 km / h; flight duration — 45 min.

OE5 228

The development of a single-seat high-altitude reconnaissance aircraft, which began in 1940, was carried out as part of the REZ research work on pressurized cabins of high-altitude aircraft, means of rescuing the pilot, working out LRE designs at high altitudes, etc.

PE 228 was actually a glider equipped with a NUUK 509 rocket engine. It was assumed that the BE5 228, delivered to a height of 10 thousand meters, should unhook from the carrier aircraft or tow, turn on the rocket engine and climb to 23-25 thousand m. Further, the flight should take place in a planning mode, and the engine should be turned on periodically. During the flight, which lasted about 45 minutes, it was planned to conduct reconnaissance with the help of infrared cameras. After running out of fuel, a gliding flight to the base was made, the estimated range was 1 thousand km.

Wood was used to the maximum in the design of the aircraft, the forward part of the fuselage with the pressurized cabin was separated from the rest of the fuselage by a partition, and three plexiglass panels were used for cockpit glazing.

In the first experimental machine, the pilot was sitting, but starting from the second machine, he was lying down. The temperature and composition of the atmosphere in the cabin were maintained by an air conditioner. In an emergency, the entire nose, attached to the fuselage with four explosive bolts, was separated from it, after which it was stabilized by an automatically released parachute. When a certain height was reached, the bed, together with the pilot, was ejected from the cockpit with compressed air, then the rescue parachute was opened.

4 M.i V Kozyrsva 97

In the central part of the fuselage were tanks with fuel and oxidizer, as well as two infrared photographs. camera, under the fuselage - landing ski. In the rear fuselage were the engine and chassis crutch.

The first experimental machine PES 228U1 (code O-1BRO), built in 1943, was tested in a non-motorized mode, first at the OGS flight base in Hershing, and then in Rechlin. The Go 217K was used as a carrier aircraft. The second machine PE$ 228U2 was tested only in non-motorized flights. The laid down series of 10 OE$ 2284-0 machines was never built until the end of the war. BE5 228 \ 2 was destroyed in Hörsching in May 1945 during an allied air raid, and the surviving REZ 228U1 was captured by the Americans in Ainring. In June 1946, the car was taken to England and handed over to the Slingsby glider company, which used some of the technical solutions used in REZ 228 to develop its own T 44 high-altitude glider.

Characteristics of PE 228: wingspan - 17.6 m, area - 30 m?; aircraft length - 10.59 m; height - 2.92 m; empty weight - 1350 kg; takeoff weight - 4210 kg; landing speed — 80 km/h; maximum speed - 900 km / h at the ground and 700 km / h at an altitude of 23 thousand m; maximum flight range — 1050 km; practical ceiling — 25 thousand m.

0E5 346

The project of a high-altitude supersonic reconnaissance aircraft was developed at the end of 1944. It was a further development of the OE8 228 aircraft, but with a swept wing and a NUK 509 two-chamber rocket engine. vlyat landing on the ventral ski.

The pilot was located in the pressurized cockpit lying down, access to it was carried out through a canopy that moved forward. Serial production of the aircraft was planned to be organized at the Siebel firm, by the end of the war a wooden full-size mock-up was made and the assembly of the first prototype under the designation 51 346 began.

After the end of the war in 1946, at the direction of the Soviet leadership, three experimental machines were built in Germany under the designation "346". The aircraft performance study program was terminated in 1951 after the third prototype was lost during flight tests.

Aircraft similar to the PE5 346 have been developed in the USA since the end of 1944 at Bell in January. In 1946, the X-1 rocket plane was created, on which in October of the following year a speed record was set - M = 1.05. Then other modifications were built: the aircraft under the designations X-1A, X-1B and X-1r.

Ab;

Under the designation A6, a project was developed for a supersonic rocket aircraft, which von Braun proposed to the Luftwaffe command as part of the program for the development of an object interceptor, announced in the late spring of 1944. The aircraft, 15.75 m long, had a swept wing with a span of 6.33 m, the pilot was located in a pressurized cabin in the forward part of the fuselage. In the tail section of the fuselage there was a combined power plant, consisting of a liquid-propellant rocket engine with a thrust of about 12 tf, and a direct-flow air

jet engine (ramjet), liquid oxygen was assumed as the oxidizer, and methanol as fuel. The estimated maximum aircraft speed was 2900 km/h.

The plane took off vertically, like a rocket. After the liquid-propellant rocket engine was switched off, the ramjet engine went into operation and the machine carried out a level flight for 15-20 minutes. Landing was carried out on the runway with the help of a wheeled landing gear. To reduce the landing distance, a brake parachute was provided in the rear fuselage. The radius of the aircraft was about 800 km, flight altitude - up to 95 km. However, von Braun's proposal was rejected by KIM.

Ag E.381 I

By December 1944, the Arado firm completed work on the project of the Ak E.381 missile fighter-interceptor. at 1000 m altitude of allied bomber formations must attack them in a dive mode. The rocket engine was turned on to perform a second attack. The return to the base after completing the combat mission was carried out in a gliding mode with a landing on a retractable ventral ski; if necessary, a braking parachute could be used during the run. The project was carried out in three versions - Ag E.381-1, Ag E.381-P and At E.381-PI.

The Ag E.381-1 fighter was equipped with a NUK 509A-2 rocket engine. The car had a rectangular wing and "

tail unit, as control surfaces

They used ailerons, elevators and rudders. .

The cockpit of the fighter, in which the pilot was lying down, was a steel pipe inserted into the fuselage with a wall thickness of $ mm. The glazed nose fairing had a protective screen made of reinforced glass 140 mm thick inside. Cabin Access

was carried out through the upper armored hatch, so the pilot could not leave the cockpit before separation from the carrier aircraft.

The fuel tanks were located behind the cockpit: two tanks with fuel (C-5io!) - on the sides of the pilot's legs, one with an oxidizer (T-Zui) - behind his feet. In the wing above the fuselage there was one MK 108 cannon with 45 rounds of ammunition. To increase the survivability of the aircraft, metal plating and a power pack were used in its design. During high-altitude flights, the pilot used an autonomous oxygen device; to heat the fighter cabin, warm air was supplied from the carrier aircraft. In addition, the pilots of both aircraft had a telephone connection for negotiations, as well as a power line to ensure the uninterrupted operation of the interceptor's instrumentation. The modular design of the machine made it possible to quickly disassemble the aircraft (wing, fuselage, tail) after landing and transport it in an aircraft or car to a new base.

The second version of the Ag E.381-N had a slightly improved view from the cockpit, increased wing span and length of the aircraft. LRE NAJK was used as the engine. 5098, armament - one MK 108 cannon and two K?, 73 missiles on the wing tips. I

The third version of Ag E.381-Sh had increased dimensions compared to the second version. The fuselage cross-sectional shape approached triangular, which made it possible to install the entrance hatch on the side. This was done in order to enable the pilot to leave the aircraft before separation from the carrier in the event of an emergency. The wingtips were bent down, which allowed them to be used. when landing as additional supports. Instead of a cannon, six K7 65 missiles suspended under the wing were supposed to be used as weapons.

According to the company's estimates, the labor intensity of manufacturing one aircraft E.38! was 600 man hours, and the following materials were required: 670 kg of steel, 120 kg of wood and 40 kg of aluminum alloys. A wooden full-size mock-up was made, several wooden frames, and perhaps the only unmanned prototype for towing tests. Work on At E.381 was terminated due to the lack of an order from KIM.

Characteristics of Ag E.381-1: wingspan - 4.43 m, area - 5 m?, aircraft length - 4.69 m; height - 1.29 m;

empty weight - 830 kg; valet weight - 1200 kg; fuel weight - 52 kg; oxidizer weight - 150 kg; maximum speed at an altitude of 8,000 m is 900 km/h.

Characteristics of Ag E.381-11: wingspan - 5 m, area - 5 m2; aircraft length - 4.95 m; height - 1.15 m; takeoff weight --.1265 kg; maximum speed at an altitude of 8,000 m is 885 ky/h.

- Characteristics of Ag E.381-ShPI: wingspan - 5.05 m, area - 5.5 mg, aircraft length - 5.7 m; height - 1.51 m; takeoff weight - 1500 kg; maximum speed at an altitude of 8 thousand m - 895 km / h.

Ag TEM! 16/43

In August 1943, the Arado firm began “studying promising jet fighters. Designer Wilhelm van Nees proposed for development three variants of the Ag TEUU 16/43 fighter: an aircraft with two turbojet engines, a rocket aircraft and an aircraft with a combined power plant (turbojet engine + rocket engine).

The Ag TEU/ 16/43-13 was a low-wing missile interceptor. N/K engine. 509A was located in the rear fuselage, in the middle part behind the cockpit * of the tank for fuel components (T-btoy and S-8ÿoy). Chassis - there were two tricycle with spherical tires. Armament was installed in the bow under the cockpit - two MK 108 cannons and two MC 151 cannons. The first experimental vehicle was undergoing flight tests, but work on the project was soon stopped, since serial production of the Me 163 missile interceptor had already begun.

Characteristics Ag TEM 16/43 13: wingspan - 8, 85 m; aircraft length - 9.7 m.

Me R.1103

The first version of the Messerschmitt Me R.1103/1 mini-missile interceptor project was developed in early July 1944. The aircraft structure was made mainly of wood, the wing had a steel spar. The pilot entered the cockpit through the top hatch and lay down in it. A gun was installed under the pilot's bed

E 102

MK 108 and a rocket could be suspended, two Schmilding 513 solid-propellant rocket engines were installed under the fuselage.

The interceptor took off with the help of a drop-down launch cart in tow behind the aircraft by a BE 10986 or Me 262 tug. Then, dropping the front of the cockpit, the pilot left the plane with a parachute, while the plane parachuted down to the ground to be reused.

The second version of the Me R.1103/N project, developed in September 1944, differed from the previous one in that the pilot was placed in the cockpit, instead of solid propellant engines, the K 1 202 liquid-propellant engine was installed in the tail section. Xia on a retractable ventral ski. In an emergency, the pilot left the aircraft with a parachute, having undocked the cockpit, which was fastened with explosive bolts, from the fuselage. Work on Me R.1103 was stopped after the decision to build Ba 349 was made.

Characteristics R.1103 / 1: wingspan - 6.2 m; aircraft length - 4.7 m; maximum speed - 810 km / h.

Characteristics R.1103 / 1: wingspan - 5.38 m; aircraft length — 5 m; maximum speed - 700 km / h.

Me R.1104.

The Me R.1104 mini-missile interceptor, like the Me R.1103, had a rectangular wing and a rear fin. The pilot was seated in the cockpit, one MK 108 cannon was located in the forward part of the fuselage, and the NUUK 509A-1 liquid-propellant engine was located in the tail part, landing was carried out on a retractable ventral ski. It was developed in two versions, slightly different from each other. The emergency escape of the aircraft was carried out in the same way as in the second version of the Me R.1103. The design was carried out in August-September 1944, but all work on the Me R.1104 was stopped after the decision was made to build the Ba 349.

Characteristics Me P.1104: wingspan - 6.2 m; aircraft length — 4.7 m; maximum speed - 810 km / h.

Zee EE 127

The project of the mini-missile interceptor ÿsh EE 127 Maÿ developed by the Junkers company! implemented the concept of conventional aircraft takeoff and landing with the help of a three-wheeled retractable undercarriage. The ÿi EE 127 was equipped with an NMK 509A-2 LPRE, the pilot was located in the cockpit, two built-in MK 108 guns were installed on the sides of the cockpit. T-S: 0ÿ in two tanks. A windmill of an electric generator was installed on the nose 00-tekatel of the fuselage, and attachment points for the launch boosters were installed in the rear part of the fuselage.

Characteristics of the Jo EE 127: wingspan - 6.27 m, area - 8.9 m, aircraft length - 7.45 m; height - 2.3 m; takeoff weight - 4900 kg; maximum speed at an altitude of 6,000 m is 950 km/h.

Ju EE 127 194

yem interceptor

In 1944, Focke-Wulf developed an aircraft project that had a swept wing and a T-shaped tail. The power set of the wing was made of wood, the sheathing was metal. The 509ÿ-1 liquid-propellant rocket engine was to be used as a power plant, the pilot was seated in the cockpit, two MK 108 guns were installed in the wing from both sides of the fuselage.

Aircraft characteristics: wingspan - 6 m, area - 10 m?, aircraft length - 4.8 m; takeoff weight - 2133 kg; maximum speed - 800 km / h; climb time — 5900 m in 60 s 16 500 m in 100 s.

Ree interceptor

Not R.1077 Ishipe

In 1944, the Heinkel firm developed a design for the He R.1077 Ishia interceptor. The aircraft had a trapezoidal two-spar wooden wing with tips bent down, a wooden fuselage and spaced vertical tail, also made of wood. Used as landing gear

two retractable ventral skis. Two MK 108 cannons were placed in fairings on both sides of the cockpit, and the NUUK 509A-1 LRE was placed in the rear fuselage. In the tail part of the fuselage, attachment points were provided for launch boosters when launched from a ground-based launcher.

The project was developed in two versions - R.1077 Iona G and R.1077 Iica P. The La I aircraft had a cockpit with the pilot lying down; and LSha P - a cockpit with the pilot sitting. After discussing numerous projects of missile interceptors in KEM, the Heinkel project He P.1077 was declared the winner of the competition.

Characteristics of R.1077: wingspan - 4.6 m, area - 7.2 m2; aircraft length - 6.8 m; height - I eat; takeoff weight - 1795 kg (la I - 1840 kg); maximum speed - 980 km / h (Sha P - 970 yy rate of climb - 192 m / s.

Vo 349

As mentioned above, the project He P.1077 became the winner of the competition for the development of a missile interceptor. However, E. Bachem, the former technical director of the Fieseler company, who submitted his initiatives to the competition

ny project of a one-time missile interceptor BP.20,.

managed to enlist the support of G. Himmler. Therefore, a day after the announcement of the winner of the Heinkel project, the proposal of E. Bachem under the designation Ba 349 was given priority.

In the summer of 1944, it was decided to start production of E. Bachem's object-based mini-missile interceptor under the designation Ba 349 Makeg ("Viper"). In July of the same year, the company Bachem Werke GmbH was created, to which the technical director of Dornier, H. Beth Beder, passed, and in August work began on Ba 349 under the personal

the control of Colonel Knemeyer of the Technical Department-"

tament KEM.

The interceptor was supposed to take off from a ground launcher, attack the enemy with unguided missiles, and after using all the missiles, ram it. Just before the collision, the pilot

The grabber was supposed to eject, at the same time, with the help of explosive bolts, the tail section of the fuselage from the rocket engine was disconnected and landed on a parachute. The surviving propulsion system was to be reused.

The design of the Ba 349 was mainly made of wood, the straight wing did not have any mechanization, and the aircraft was controlled using control surfaces located on the cruciform tail unit. The cockpit was located in the forward part of the fuselage, and under the plastic nose cone there was a honeycomb battery of rockets (24 rockets of 73 mm caliber or 34 rockets of 55 mm caliber). To protect the pilot in flight, it was planned to armor the cockpit - install a front armored plate behind the rocket battery, and a rear armored partition behind the seat.

The cockpit contained: control panel, pilot's seat, rudder pedals, fire control pedal, aircraft control stick, Patin autopilot, oxygen equipment and radio control equipment. Aiming during the attack was carried out with the help of a frame located in front of the cockpit between the fairing and the windshield. The windshield had a thickness of 60 mm, the hinged part of the lantern opened up and back, and was dropped when the pilot left the aircraft.

In the middle part of the fuselage there was a wing and two fuel tanks - the lower one for S-bÿuÿÿ for 190 l, the upper one for T-Zuy for 440 l - rex launch boosters "Schmidding 533" and a container with a parachute.

The takeoff of the aircraft from the launcher was carried out with the simultaneous operation of the launch boosters and the LRE, set to the idle mode. The LRE thrust was limited to limit the starting overload to 2.5 V. It was believed that even with this overload, the pilot could not cope with the control, so the rudders were blocked before launch in a predetermined position, which ensured the safe departure of the aircraft from the guides of the launcher. At an altitude of 170-200 m, boosters were dropped, the rocket engine was brought to full thrust and the autopilot was turned on,

controlled by radio from the ground. When reducing the overload at an altitude of about 1200 m, the pilot had to switch

„ti on manual control. After completing the combat mission, the pilot had to leave
airplane.

During the development of the aircraft, it turned out that the cockpit was too small to accommodate the ejection seat, and the design of the seat itself had not yet been worked out. For this reason, the concept of leaving the aircraft by the pilot. was changed: now he had to unfasten the seat belts, disconnect the aircraft control stick, tilt the canopy and drop the forward fuselage. The bow was separated along with the windshield, front bulkhead and control panel. The deployed brake chute in the tail section seemed to shake the pilot out of the seat forward, after which the pyrotechnic bolts were activated, connecting the tail section with the middle part of the fuselage. After separation, the pilot and the tail section, together with the propulsion system, each landed on their own narashute.

The first prototype Ba 349 was intended for towing flight tests and had a tricycle wheeled chassis. It was first taken into the air without a pilot in November` 1944 in tow behind the He 111 aircraft,

The first unmanned vertical launch with the help of boosters from a ground-based launcher was scheduled for December 18, 1944 (an LRE was not installed). The tests ended in failure - the aircraft did not leave the guides of the launcher due to the fact that the launch accelerators burned out in the places of the ignition wiring; The first successful unmanned launch took place on December 22, after which another 10 unmanned vehicles successfully launched. According to the test results, a number of changes were made to the design of the Ba 34916, which became the prototype of the A series machines. At the same time, the ministry decided to stop parallel work on the Heinkel project No R.1077 Gaia, which were at the stage of building a prototype. . 2

On February 25, 1945, the first full launch of the Ba 349A took place with a rocket engine and a dummy in the cockpit. The flight was successful, after which KIM demanded to speed up the tests and switch to manned flights. February 28

For the first time, test pilot Lieutenant Lothar Siebert took off for the first time on a Ba 349A. The plane started successfully, but during the climb the cockpit canopy spontaneously opened, concussing the pilot. The car, gaining an altitude of about 1500 m, jumped and exploded when it hit the ground, the pilot died.

Despite the catastrophe that occurred during the first manned flight, the tests continued, having performed 34 launches until April 1945, including 7 manned ones. After testing on the aircraft, the tail section of the fuselage was redesigned for the new two-chamber NUK 509S liquid-propellant rocket engine, the hardpoints for launch boosters were moved closer to the tail, and the height of the fuselage was slightly increased to accommodate two MK 108 cannons. 349A 50 experimental machines, immediately launching the Ba 3498 into mass production (the first batch of machines was to have the designation Ba 349V-1).

A total of 36 aircraft were built before the end of the war, among them three experimental Ba 3498s, one of which flew. None of the built Ba 349 aircraft had time to take part in combat operations, although 10 aircraft were placed at Kirkheim at starting positions to repel allied air raids. Almost all of them, together with their launchers, were destroyed by special SS teams during the retreat, but four vehicles were captured by the allied forces - three American and one Soviet. At the very end of the war, the technical documentation for the Ba 349 was acquired by the Japanese, but not a single car was ever built. Currently, one copy of the Ba 349 is in museums in the United States and Germany. -

Characteristics of Ba 349A: wingspan - 4 m, area - 4.7 m?; aircraft length - 6 m; height - 2.5 m; empty weight - 800 kg; takeoff weight - 2 thousand kg; maximum speed - 900 km / h; rate of climb - 183 m / s; LRE operating time - 2.23 min.

Characteristics of Ba 3498: wingspan - 4 M, area - 4.7 m2; aircraft length - 6 m; height - 2.25 m; empty weight - 880 kg; takeoff weight - 2234 kg; maximum speed - 990 km / h;

eco-lifting capacity - 190 m / s; LRE operating time - 4.36 min.

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50 344

Engineer Heinz Sombold developed the 50 344 mini-missile interceptor project. The NUK 509 liquid-propellant rocket engine with a thrust of 1500 kg, installed in the rear fuselage under the cockpit, was used as a propulsion system. Small arms were mounted in the middle part of the fuselage over the wing — two MS 151 cannons or one MK 108.

In January 1944, H. Sombold modified his machine. The design feature of this aircraft was the detachable nose (warhead) with an explosive charge weighing 500 kg and a proximity fuse during a target attack; to improve the accuracy of hitting the target, the warhead had plumage. It was supposed to launch a warhead at bombers marching in a "combat box" type formation. Until the end of the war, only astrodynamic tests of models on a scale of 1:5 were carried out.

Characteristics 5o 344: wingspan - 5.7 m; length - 7 m; height - 2.2 m; flight weight - 1350 kg.

50 344

7. RAMING FIGHTERS

In the West, it is generally accepted that the air ram as an unusual method of warfare was developed at the beginning of World War II by Soviet pilots in conditions when German aviation had an advantage over Soviet aviation. However, the ram was not at all an invention of the Second World War. Even at the dawn of the development of aviation, people already thought about the possibility of using an air ram. One of the first who theoretically substantiated this possibility was N.A. Yatsuk. In 1911, he published an article in which he said that the airplane itself was also a weapon. Along with the prediction of the appearance of cannons, machine guns and bombs on flying apnarats, he wrote: “It is possible that in exceptional cases pilots will decide to ram someone else’s airplanes with their airplanes.” At the 1st All-Russian Aeronautical Congress in April 1911, N.A. Yatsuk made two presentations. Lieutenant P.N. It was then that Nesterov first heard about the air ram, and later he and Yatsuk became friends. |

After the outbreak of World War I, P.N. Nesterov headed the 11th Corps Squadron of the 3rd Army of the Southwestern Front. Preparing for combat operations, Staff Captain Nesterov intensively developed tactics for conducting air combat, including ramming. On September 8, 1914, 6 km from the city of Zholkev (now the city of Nesterov, Lviv region), Nesterov twice unsuccessfully tried on his Moran-S plane to intercept the Austrian plane Albatross RO, which was carrying out reconnaissance of the

positions of our troops. When the Austrian appeared for the third time, Nesterov quickly took off, overtook the enemy and knocked him down with a ramming blow. However, during the execution of the world's first air ramming, P.N. Nesterov died.

In 1924, Yatsuk published a work on military aviation tactics, in which, in particular, he expressed the following idea about air ramming: moral influence on the enemy”. According to this tactic, the attacking pilot must hit the enemy aircraft at a vital point with the wingtip of his aircraft or

use the propeller of the engine to cut down the surfaces of the tail unit of the enemy aircraft. Although this tactic was often fatal to the attacker himself, with some skill and luck, the pilot could survive with only damage to the aircraft, or even return and land at his own airfield.

The air ram became a truly mass phenomenon during the Great Patriotic War. Soviet pilots used rams on all types of production aircraft: fighters, attack aircraft, bombers, reconnaissance aircraft. Ramming rams were made in group and single battles, day and night, in clear skies and clouds, at low and high altitudes, over own territory and over enemy territory. But according to Major General of Aviation A.D. Zaitsev, in 1941-1945. Soviet Air Force pilots made 636 air rams. At the same time, enemy aircraft lost more than 1,500 flight personnel.

Contrary to popular belief that a ram attack is suicidal, statistics show that approximately 37% of pilots died during a ram attack. However, the remaining 63% of the pilots not only remained alive, but many of them continued to fight and landed on their aircraft. There are cases when pilots made two rams in one battle. Several dozen people made the so-called "double" rams, when the enemy plane could not be shot down the first time and it was necessary to finish it off with a repeated ramming. The highest achievement in the world belongs to the Soviet pilot B.I. Kovzan, on whose account there are four

wound. Despite the severe wound received during the last ram, B.I. Kovzan shot down 6 more enemy aircraft before the end of the war, bringing his personal score to 28 victories. After the war, he continued to serve in aviation, in 1954 he graduated from the Air Force Academy. For military merit B.I. Kovzan was awarded two Orders of Lenin, Orders of the Red Banner, Orders of the Patriotic War of the 1st degree, Orders of the Red Star, and medals.

The high command of the Luftwaffe, faced in 1941 with such an unusual way of conducting air combat, issued a circular forbidding German pilots to approach Soviet aircraft closer than a hundred meters in order to avoid ramming from their side. However, the further course of the war made its own adjustments to the tactics of combat by German pilots. In 1944, the air defense of the Reich appeared. There were special groups of "hunters", staffed by volunteers and penalized. The penitentiaries signed an obligation to shoot down an enemy bomber in every battle. If there was not enough ammunition, then they were obliged to ram it, failure to fulfill the obligation was considered as “cowardice in the face of the enemy.” However, even such emergency measures did not help the Luftwaffe to rectify the situation, therefore, at the end of the war, KIM issued a technical assignment for the development specialized ram fighter.

Fighter company "Gotha"

The Gotha firm proposed a project for a ram fighter designed to attack formations of allied bombers. Two versions of the machine were developed - one with a liquid-propellant rocket engine in the rear fuselage, the second - without an engine (glider). The launch of the fighter was supposed to be carried out <carrier aircraft. The pilot's cockpit was made in the form of an armored cone; two variants of the cockpit location in the aircraft were considered. In the first version, the cabin occupied the entire bow of the vehicle. During the attack, the aircraft pierced the attacked bomber with a cone, while the cone separated from the fuselage and flew right through the bomber, after which it was descended by parachute. To provide the pilot with at least

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Ram fighter firm "Gotha"

minimal chances of surviving a ramming, it was planned to install a seat that would automatically transfer the pilot to a horizontal position so that he could endure large overloads upon impact. To do this, there was a device on the nose of the cone that, upon impact, gave a signal to the actuators to turn the folding part of the pilot's seat to a horizontal positiọn.

and to disconnect the cone from the fuselage of the fighter.

In the second version, the cockpit was docked to the fuselage from above, and the forward part of the fuselage of the fighter carried an explosive charge to enhance the destructive effect when it hit the bomber. During the impact, the cabin shot back up, and then it made a free descent by parachute. In addition, the option of installing an ejection seat was considered, which a second before the impact would throw the pilot out of the cockpit, after which he would descend by parachute. The firm's proposal did not receive official support.

Katteg E

The Katteg (Taran) fighter was designed by the Zeppelin firm in November 1944. It was supposed to be delivered to the attack area by a BE 109 towing aircraft, after uncoupling, attack enemy aircraft with unguided missiles, and, if necessary, use a ram.

The aircraft had a rectangular wing and a normal single-fin tail, under the fuselage there was

retractable landing ski. In the tail section of the fuselage housed a solid rocket engine "Schmid- | ding", the operating time of which was about 10 s, the pilot was seated in the cockpit. There was a battery with 14 K4M unguided rockets of 55 mm caliber under the drop nose cone. The pilot's cockpit was armored, and the wing was reinforced so that the interceptor would not receive serious damage during a ram attack by an enemy aircraft. In an emergency, the pilot could leave the plane with paranoia by undocking the cockpit from the fuselage, which was fastened with explosive bolts. Characteristics Kaputeg: wingspan - 4.9 m; aircraft length - 5, m; height - 1.2 m, starting weight - 860 kg; maximum speed - 970 km / h. at

Rpedepde Rapheai$!

The aircraft of the Zeppelin company, the Henerepde Onaka (“Flying Armored Fist”), was developed as a ram fighter. The pilot was located in the cockpit lying down; the flight was mated with the towing vehicle. BE 1096. Designed for takeoff

single wheel landing gear under the fuselage. The tail unit was of the moth type. On the sides of the fuselage behind the wheel

six solid-propellant rocket engines were installed (three on each side), which were turned on by the pilot after uncoupling from the towing vehicle.

Armament - two K2 missiles. 65 suspended under the wing. In the event of an unsuccessful attack by an enemy aircraft with missiles, the pilot of the projectile aircraft had to ram. After completing the combat mission, the pilot undocked the nose of the cockpit and left the aircraft with a parachute. The divided aircraft was lowered by parachute, where it was picked up by a special team of three people and delivered by tractor to the launch site for reuse. :

Characteristics of ETserepde Raptegaÿÿÿÿ: wingspan - 4.5 m, area - 3.8 m?; aircraft length - 6 m; weight - 1200 kg; maximum speed - 850 km / h.

8. FIGHTERS WITH PULSE AND DIRECT-FLOW ENGINES

In 1941, BEM began a program to develop so-called "pocket aircraft", which were launched in flight from a carrier aircraft. Such an aircraft could be used both as a heavy bomber escort fighter and as a light bomber capable of penetrating into a well-defended enemy zone at low altitude. In addition, a bunch of two aircraft could be used as a long-range reconnaissance aircraft. The Messerschmitt firm was involved in the development of a “pocket aircraft” equipped with a simple design and cheap to manufacture pulse jet engine.

In November 1944, KIM, using the experience of creating the “people's fighter” He 162A, issued technical requirements for the development of an even more simplified “baby fighter” (Miashijareg). The Az 014 pulsating engine, which was used on the E! cruise missile, was planned as the aircraft power plant. 103. According to the technical requirements, a minimum of scarce materials should have been used in the design of the aircraft, not. provided for no electronic equipment, | the advantage in the air over enemy aircraft was to be achieved by releasing a sick number of aircraft. Pilots, as in the case of the "people's fighter", were to be supplied by the youth organization of the Hitler Youth. Three firms took part in the program: Blom and Voss (Vu P.213), Heinkel (He 162B and He P.1077 Koteo) and Junkers (Jo EE 126).

At the same time, fighters with ramjet engines were being developed. To them

included the above-mentioned Lippish aircraft (1 R.11-121, M R.12, P R.13) and Heinkel (Not R.1080), as well as aircraft from Focke-Wulf (Ta 283), Skoda (5K R.14) and "Messerschmitt" (Me 262 Gotz).

- Me 328

In July 1941, the Messerschmitt company began work on.

experimental project Me P.1079, the purpose of which was to create a miniature high-speed aircraft launched from a carrier aircraft. As a propulsion system, it was supposed to use a PUVRD, the development of which was carried out by German engine builders. The choice fell on pulsating engines because, in comparison with turbojet engines, they are structurally simpler due to the absence of a compressor and turbine and, consequently, much cheaper to manufacture. It was assumed that by the time the development of the mini-aircraft was completed, mass production of pulsating engines would already be launched.

REZ was also involved in the preliminary studies related to the determination of the possible appearance of the future mini-aircraft. At the beginning of 1942, after discussing the results obtained, a variant of the Me R.1079/17 project was chosen, which was assigned the designation Me 328 by KIM.

league en 1.

and the Me 3288 fighter-bomber. It was supposed to use the Az 014 PUVRD with a thrust of up to 300 kgf, the mass production of which was to begin at the end
the same year.

The Az 014 engine was a 36 m long pipe, consisting of an inlet with a valve grill, a combustion chamber with fuel injectors and spark plugs, and an exhaust pipe. He worked as follows. When the combustible mixture formed as a result of the fuel supply was ignited, an explosion occurred, the pressure in the combustion chamber increased and

valves on the grate were closed. The combustion products were thrown into the exhaust pipe and flowed out of it into the atmosphere in the form of a jet stream. As a result of the fuel mixture burning out, the pressure in the chamber dropped below atmospheric, the valves opened, and a new portion of air entered the chamber, a new explosion occurred, and the cycle was repeated at a frequency of 60–70 Hz.

At the end of March 1942, Messerschmitt submitted proposals to the KEM Technical Department for the development of six versions of the aircraft:

Me 328A-1 - with two Az 014 engines and two MS 151 guns;

Me 328A-2 - with larger overall dimensions compared to the A-1, four engines and two MK 103 guns;

`
Me 328A-3 - like version A-2, but with a device for in-flight refueling from an aircraft
carrier;

Me 328V-1 - like the A-1 version, but capable of carrying a bomb weighing up to 1000 kg under the fuselage;

Me 328V-2 - like the A-2 version, but capable of carrying a bomb weighing up to 1000 kg under the fuselage;

Me 328V-3 - like the V-2 version, but designed to deliver the 8P 1400 bomb weighing 1400 kg.

It was envisaged that the Me 328 would be launched from the back of the He 177 or Me 264 carriers (Mistel scheme). After the detachment, he had to protect the carrier bomber from attacks by enemy fighters, but after completing the combat mission, return to his airfield and land on a retractable ski. As a fighter-bomber, the Me 328 unhooked from the carrier not far from the enemy zone, penetrated it at low altitude and attacked.

bombed a ground target or a ship, after which he returned to his airfield. In addition to the options for separate performance of functions, the option of combined combat use was also considered: at first, the Me 328 performs the tasks of a light bomber, then it returns to the carrier aircraft, refuels and performs the functions of an escort fighter.

Calculations showed that the cost of producing one Me 328 should be four times less than the production of one Ru 190 or one BE 109.

- the first ten experimental machines (from Uÿ to U10) began a year later (in March 1943) at the production facilities of the glider company TacoB Sciueyer bersÿyiegenaÿap in cooperation with PE$. The first three experimental machines had a wooden wing, a metal fuselage, and the tail section of the fuselage was borrowed from the serial BE 109 fighter.

man-hours per aircraft.

In parallel with the construction of experimental machines, intensive tests were carried out in a wind tunnel in order to determine the optimal location of the Az 014 engines. When the engines are located above or below the wing

“there was a harmful effect of vibration on the power elements of the wing and, in addition, jet” on the side engine jets fell on the tail. The installation of the tail section engines made it possible to of the fuselage in the avoid these impacts, but, on the other hand, there were problems with the fastening of the engines and the effect of vibration on the tail section. ÿ 9

At the end of 1943, in fulfillment of the requirements of A. Hitler to accelerate the development of new types of offensive weapons, it was decided to stop work on the A series and concentrate all efforts on the development of B series machines. In the autumn of the same year in Hörsching (Austria) started

flight tests of the first experimental machine without engines Me 32881, conducted by test pilots Hanna Reitsch and Heinz Kensche. Po 217 (tail code UG+EG) was used as a carrier aircraft, tests were carried out in the altitude range from 3 to 6 thousand meters and speeds from 145 to 745 km/h. Non-motorized tests showed that

the aircraft has good aerodynamic characteristics. In April 1944, an order was issued for the construction of a pre-production batch of Me 328V-0 aircraft at a plant in Thuringia.

The Me 328V-0 was an all-wood construction. Two front fuel tanks occupied the forward part of the fuselage, two rear fuel tanks were located in the tail part. Inter-. There was an armored partition 15 mm thick between the compartment of the front tanks and the cockpit; in addition, an additional armor plate 15 mm thick and a reinforced glass screen 80 mm thick were installed in front of the pilot's seat in the cockpit. The hinged part of the cockpit canopy opened up and to the right. To ensure the possibility of an emergency evacuation of the aircraft by the pilot, the tail section of the fuselage was attached to the middle section using explosive bolts. When it was separated, the seat, together with the pilot, seemed to be pulled out of the cockpit, after which the pilot descended by parachute. . The landing gear of the aircraft was a retractable ventral ski, which was also a bomb rack. For this reason, the Me 328B, having taken off from a carrier aircraft with a suspended bomb, could land on a ski only after the bomb was dropped. The engines were installed under the wing on holders with dampers, the lower surface of the wing at the place where the engines were installed had an asbestos coating. Fuel was supplied to the engines with the help of an electric pump, which was powered by a battery before the start of the electric generators. During the flight, the electric generators were rotated by two windmills located in the wing root (on some experimental machines, windmills were located near the wingtips). °

Experienced cars with engines took off from the ground at. with the help of the KG-12 Madezhipa catapult, the KAV rail rocket launcher or behind the towing aircraft on a drop two-wheeled launcher. The engines could be jettisoned in flight in the event of an emergency. At the stage of flight tests, the main troubles began, associated with the harmful effects of vibrations and acoustic loads on the power frame of the aircraft. There were several accidents, including the loss of two cars due to destruction

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“uzi,

out parts. For this reason, not a single Me 328V-0 machine from the ordered pre-production batch was built, and all further work on the aircraft was stopped.

Characteristics of the Me 328A-1: wingspan - 6.4 m, area - 7.5 m; aircraft length - 6.83 m; height - 2.1 m; takeoff weight - 2200 kg; maximum speed - 755 km / h; rate of climb at an altitude of 4 thousand m - 16 m / s; range - 770 km.

Wu R.213

Wu R.213 was a single-seat fighter with a pulsed Az 014 engine installed under the tail boom, its air intake was located in the forward part of the fuselage, and the tail unit of the aircraft was U-shaped. The fuselage of the fighter was made of thin-sheet armor; a fuel tank with a capacity of 420 liters was located behind the cockpit. The wing and tail unit were made of wood. Behind the fuselage there was a tail boom, to which the Az 014 engine was attached with brackets. The front part of the engine was attached to the air intake channel using a rubber spacer. This spacer was designed to dampen the vibrations of the engine during its operation.

Since the engine could start its work only in the conditions of the oncoming air flow, the takeoff of the aircraft had to be carried out from a catapult or with the help of rocket launchers.

accelerators. For take-off and landing of the aircraft, a three-leg landing gear was provided, the main landing gear was retracted forward, and the front landing gear - back with a turn of 90. The landing gear was retracted and extended by a compressed air cylinder or manually. An MK 108 cannon with 135 rounds of ammunition was installed in the forward fuselage. The project was canceled due to the cancellation of the program in December 1944,

Characteristics of Wu R.213: wingspan - 6 m, area - 5 m?; aircraft length - 6.2 m; height - 2.28 m; takeoff weight - 1280 kg; maximum speed near the ground - 705 km / h; maximum speed at an altitude of 6 thousand meters - 625 km / h; rate of climb near the ground - 18.9 m / s; - radius of action - 170 km; practical ceiling - 7700 m.

Not 1628

The He 162A aircraft was taken as the basis for the development of the He 1628. All changes were actually reduced to the replacement of the VMUU 003 turbojet engine with a pulsating engine.

Not 1628-1 had two Az 014 pulsed engines located side by side, mounted on top of the fuselage closer to the tail. Two guns MK 108 or MS 151 were to be used as armament.

Not 162V-2 differed from the previous version in that it was supposed to install one Az 044 pulsating engine with a thrust of 500 kgf. A

Characteristics of He 1628-1: total thrust of engines - 670 kgf; wingspan - 7.2 m, area - 11.15 m2; aircraft length - 9 m; height - 2.55 m; takeoff weight - 3300 kg; maximum speed near the ground - 810 km / h; rate of climb near the ground — 1098 m/min; practical 1 ceiling 8 thousand m; range - 410 km.

Characteristics of Not 1628-2: wingspan - 7.2 m, flat

space - 11.15 m?; aircraft length - 9 m; height - 2.55 m; takeoff weight - 2900 kg; maximum speed near the ground - 710 km / h; rate of climb near the ground - 720 m / min; practical ceiling — 6500 m; range - 380 km.

Not R.1077 Koteo

The project He R.1077 Koteo was a remake of the rocket interceptor He R.1077 Yona, instead of a liquid-propellant rocket engine, an Az 014 PUVRD was installed above the fuselage in the tail section. filled with wood. Two retractable ventral skis were used as landing devices. The pilot was seated in the cockpit, two MK 108 cannons were installed in fairings on the sides of the cockpit, attachment points for launch boosters were provided in the rear fuselage.

Characteristics of He R.1077 Koteo: wingspan - 4.6 m, area - 7.2 m ?; aircraft length - 6.8 m; height — 1 m; takeoff weight - 1795 kg; maximum speed is 980 km/h.

Zo EE 126 A

The M EE 126 project was developed in two variants differing in the chassis design: the ÿi EE 126 ECu with a wheeled landing gear and the ÿa EE 126 ÿShu with two retractable landing skis and an aircraft length increased to 8.46 m. The Az 044 pulsating engine was installed above the fuselage and attached to the front pylon and keel (the installation diagram resembled E! 103). The fuselage is all-metal, the wing and tail unit are wooden. Pilot

located in the cockpit sitting, on the sides in the bow of the fuselage two built-in guns MK 108 or MS 151 were installed. Up to 400 kg of bombs could be suspended under the wing, for example, two containers AB 250-3, containing 108 anti-personnel bombs 50 2 each, or 24 V4M unguided missiles. A windmill of an electric generator was installed on the nose cone of the fuselage. Mounting points for launch boosters were located in the tail section of the fuselage.

Before the end of the war, the company managed to study the aircraft models in a wind tunnel and build a wooden full-size mock-up, all work on the EE 126 ceased in March 1945.

Characteristics of Lee EE 126 Bu: wingspan - 6.65 m, area - 8.9 m, aircraft length - 7.45 m; empty weight - 1100 kg; takeoff weight - 2800 kg; fuel weight - 1100 kg; maximum speed - 780 km / h; rate of climb near the ground - 480 m / min; range - 350 km; flight duration at 60% engine thrust - 45 min.

Ta 283 A

The project of a single-seat fighter with two ramjet engines mounted on the sides of the horizontal tail, the cockpit was located at the beginning of the keel. The NUK 509 booster rocket engine was installed in the rear fuselage. The armament consisted of two MK 108 cannons from below in the forward fuselage. B

Characteristics: wingspan - 8 m; aircraft length - 11.85 m; maximum speed - 1100 km / h.

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5K R.14

The project of a light fighter with a ramjet engine was developed at the beginning of 1945. The pilot was located lying in the cockpit in the forward fuselage. The fuel tanks were located in the wing and behind the cockpit above the engine. The takeoff was carried out with the help of a drop-down launch trolley and launch boosters, landing was carried out on a retractable ski. In an emergency in flight, the pilot dropped the canopy, after which the bed, together with it, was catapulted forward from the cockpit with compressed air.

The project was made in two versions, slightly different from each other, except for the places where the MK 108 gun was installed: in the BK R.14.01 version, the gun was located in the upper part of the cabin, and its barrel passed through the glazing, in the 5K R. 14.02 the gun was mounted in the inlet of the air intake. ÿ

Characteristics 5K R.14.01: wingspan - 7 m, area - 12.45 m?; aircraft length - 9.85 m; height - 4.5 m; take-off weight - 3094 kg: maximum speed at an altitude of 10 thousand meters - 998 km / h; practical ceiling - 18,288 m; climb time to a height of 14,935 m - 6.3 minutes. Engine dimensions: maximum diameter - 1.5 m; length - 9.5 m.

Me 262 isgip

Until the end of the war, the Messerschmitt firm worked on projects for numerous variants of the Me 262 jet fighter, among them the Me 262 Godot with additional ramjet engines. Dr. E. Zenger, who was in charge of the engines, took part in the development. It was supposed to install a ramjet over the main engines. Engine dimensions: length - 5.9 m; diameter of the inlet device of the air intake — 0.45 m; combustion chamber diameter - 1.13 m; jet nozzle outlet diameter - 0.85 m. It was assumed that the aircraft would reach a practical ceiling of 14,800 m in 11.3 minutes; the maximum speed of horizontal flight was to be 1148 km / h.

9. "AMERICA-BOMBER" In early 1941, the German Air Ministry, given the likelihood of the United States entering the war against Germany, adopted a program to create ultra-long-range aircraft capable of operating on targets on the Atlantic coast of the United States. In accordance with this program, called Atetika-Votbeg, German aviation companies were ordered to submit their proposals for the development of a bomber capable of carrying 20,000 kg of bombs at a distance of 7,000 km or 4,000 kg of bombs at a distance of 10,000 km. km. In addition to performing its main functions, it could be used as a strategic intelligence officer. Since it was expected that the effect of air raids on: New York and other US cities: would be more moral than material, the proposed order for serial aircraft of this class was limited to 24 aircraft. Projects from Blom and Foss were submitted to the competition (VU R.184, VU 250), Focke-Wulf (Em 300), Junkers (ÿi 290) and Messerschmitt (Me 264 and M R.08). However, at the end of April 1942, the Technical Department of the KEM, having discussed the progress of developments under the Ategika-Vatfeg program, made adjustments to the technical requirements. According to the adjusted requirements, the bomber had to reach the following regions; Dakar, Lagos, Alen, Southern Iran, in the USA - New Jersey, Ohio, Pennsylvania, Indiana, in the USSR - Baku, Grozny, Tbilisi, Magnitogorsk, Sverdlovsk, Chelyabinsk. In addition, from Japanese bases in the Philippines, the aircraft was supposed to reach Australia, India and most of the Pacific Ocean. The competition was continued

with a changed composition of participants - Me 264, L 390 and Ta 400.

On July 18, 1944, the Me 264U1 undergoing flight tests, the Me 264U2 prepared for ground tests and the Me 264U3 almost completed in construction were destroyed during an allied air raid on the Messerschmitt factories. The aircraft JA 39052 in January 1944 entered the 5th long-range reconnaissance group, based in the town of Mont-de-Marsan, south of Bordeaux, for military trials. After several training flights, the ÿi 390U2 made a sortie to an area located 20 km from the US coast north of New York, and returned to its own. base. The Li 390U3 aircraft (prototype of the serial Ji 390A) was planned to be completed in the summer, but due to the suspension of the AteypkKa-Watfeg program, its construction was not completed. For the same reason, at the end of the summer, work on the Ta 400 aircraft at the Focke-Wulf company was stopped.

However, by the end of 1944, in accordance with the requirements of the top military leadership of Germany to speed up the time frame for the creation of various types of “retaliatory weapons”, work within the framework of the Ategika-Wotbeg project resumed again. This time, BEM has already considered the proposals of Daimler-Benz and E. Senger.

OV R.A 7 EA

The Daimler-Benz company developed the R.A. OV project, which was a combination of a ZipeShotVepgareg carrier aircraft and a one-time bomber.

The carrier aircraft (ÿ.ÿ |) had a straight wing, on which there were four Ne5 021 turboprop engines.

Under the fuselage, between the landing gear of the carrier aircraft, a bomber (R.A.P.) was suspended with a butterfly tail and two VMA 018 turbojet engines under the swept wing. The bomber did not have a landing gear, up to 30,000 tons of bombs were placed in the bomb bay, a crew of 3 or 4 people was housed in a pressurized cabin in the forward fuselage. It was assumed that after
cutter

EA RA

ki from the carrier, the bomber will continue flying on its own. After completing the task, the bomber lay down on the reverse course and flew until the fuel was completely depleted. The parachute crew had to leave the car over the sea and be picked up by special rescue units of the Luftwaffe.

Characteristics of the carrier aircraft: wingspan - 54 m; aircraft length - 35.8 m; height - 12.26 m; take-off weight - 120 thousand kg; maximum speed - 500 km / h; range - 9 thousand km.

Bomber characteristics: wingspan - 22 m; aircraft length - 30.75 m; maximum speed - 1000 km / h.

OV R.V

At the beginning of 1945, Daimler-Benz developed the second version of the project, designated RV R.V. The carrier aircraft R.V [had a two-beam tail, the power plant consisted of six OV 6036 piston engines: four engines drove the tractor propellers, and two engines, located coaxially with the extreme engines, pushed the propellers . The design of the R.V.P. bomber was also somewhat changed: a spaced tail unit was installed, and one YuV $ 06 turbojet engine with a thrust of 12,930 kg was installed on top of the fuselage. . Until the end of the war, the PV R.A and OV R.V projects were not implemented.

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Aircraft AZ 6 in the hangar

and KINE E ae KA Plane A 6 (model) Plane Sha

Aircraft Vu 155 UZ

Bomb Vu 246

Aircraft Wu 141 Aircraft Wu R. 208 in a wind tunnel

Wu 110

Flight Test Wu 1.10

Naveog under the fuselage of the carrier

Rocket plane Yezrepair

May!

Mikey! (model)

Aircraft PES 194

OE$228 on back carriers

Aircraft OEB 40

Aircraft PEZ 346

Aircraft OE$ 39 Aircraft Peyia 1

Aircraft He 111 and Rÿ 103

Aircraft Not 177

Aircraft Not 177V

Aircraft Not 178

Aircraft Po 335 U13

Aircraft Ta 154

`aircraft Ta 183 (model)

Ginger interceptor (model)

EI x Aircraft ÿi 287 Aircraft ÿi 287 (model)

Aircraft ÿi EE 128 in a wind tunnel

Aircraft 11 R.11 Aircraft 14 R.14 (model)

Glider M1

“airplane 14 R1Za

Aircraft Me 163

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Plane Me 262 Via 071

Aircraft Me 329

Aircraft Me R.1106 (model)

Aircraft Ag E.381 (model)

Aircraft Ag 234 U1

aircraft Ag 440 YI

Aircraft ÿÿ 256 and helicopter ÿÿ 282

Aircraft Ei 1038.

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E199 and R21A coupling test Helicopter EI 282 21

=: Her

Plane Yem 189 U1

Aircraft P \ 190 A-Z

Aircraft GU 191 U1

Interceptor ÿ.ÿÿÿÿ (model) Aerial bomb ÿÿÿÿ-ÿ

Charging the anti-aircraft gun Goga

1. Ba 349 at the starting position 2. Ba349

Kÿepsosÿseg K1

GcheBYaire! (model) Rocket plane A9 (model)

Glider No P Motoglider N P-tog

Aircraft N Ua Aircraft N Ys

Aircraft H IX U2. Flight preparation

NIHUI

NIHUI

HIGH in flight

Rocket Kÿeÿpÿoge

CrashJoke missile at the starting position

hallistic

Mayeg interceptor launch

Rocket E55

Rocket H5 117 1, launch from aircraft 2. At the starting position

N$ 132

Rocket Hs 295

AK gun

H5 293 under the wing of the carrier

Self-propelled gun ÿb ÿÿ

Half-track armored personnel carrier Napotar

YY A ÿ

Gank T-PI

remotely

controlled tankette Vogvugagb in the parking lot (right)

Vogvugaga in action

Soya's self-propelled mine

1. Front view

2. Rear view

3. more in action

Midget submarine eeeeeeee! (prototype), equipped with caterpillars for landfall

Tilotipuemaa stomp Mena

Midget submarine Mos

7 Midget submarine Moÿsÿ

Transportation Moÿsÿ

rocket bomber

In 1936, Dr. Eugen Senger, who had previously worked on the subject in Vienna, moved to the German Aviation Institute (Berlin-Adlershof), then worked at research institutes in Volkenrode, Trauen and Einring. Here, together with his wife, Dr. Irena Bredt, he developed a project for a bomber with a 100 tf rocket engine.

A single-seat rocket bomber was supposed to be able to take off from German territory and deliver a bomb load weighing several tons to the target. The bomber had a trapezoidal wing of small elongation, carrying a fuselage with a spaced tail and a rocket engine in the rear fuselage,

The pilot's pressurized cabin was located in the forward part of the fuselage, and the view from it was very poor, since instead of the windshield, viewing side slits and auxiliary optical devices were installed. Behind the cockpit in the fuselage there were two cylindrical tanks 20.5 m long and 1.8 m in diameter, separated by sealed transverse partitions. Partitioned compartments 06 were used to store liquid oxygen (front compartments) and synthetic gas oil (middle and rear compartments). In the center section between the tanks there was a compartment that could hold up to 30 tons of bombs. Landing was supposed to be on a manufactured wheeled chassis with a nose support, two main struts and a tail spike. The horizontal takeoff of the bomber was to be carried out with the help of a special launch cart, which was a long platform with a rocket engine. At the bottom. part of the platform had a skid that slid along a rail more than three kilometers long.

E. Zenger calculated various options for the trajectories and flight modes of the bomber, below is one of these options - a bombing attack on New York from the territory of Germany (estimated distance from the launch site - 6500 km, bomb load - 6 tons).

The launch trolley accelerated the aircraft to a speed of 500 m/s, and 36 s after the launch, at a distance of 12 km from the take-off point, the rocket engine was turned on. A fuel reserve of 84 tons was produced in 336 s. After that, the speed

reached "6370 m / s, and the height is 91 km, the distance from the launch site is 736 km, the flight weight of the aircraft is 16 tons.

Further, the pilot had to take control and carry out further flight in the “wave-like” gliding mode, which was an alternation of dives into dense layers of the atmosphere with subsequent jumping into rarefied layers. The “wave-like” gliding mode made it possible to achieve a greater flight range compared to conventional steady-state gliding. At a distance of 5550 km from the launch and 950 km from the target (on the 1150th flight), the speed dropped to 6 thousand m/s, and the flight altitude decreased to 50 km. the weight of the aircraft was reduced to 10 tons.

After dropping the bombs, the aircraft had to make a U-turn with a radius of 500 km within 330 s and head to the launch site. The speed after exiting the turn reached 3700 m / s, and the height - up to 38 km. At a distance of 100 km from the landing airfield, the speed was 300 m/s and the altitude was 20 km. Subsequent gliding at subsonic speed and landing took place as in a conventional aircraft. The entire flight was supposed to last about | h 20 min.

Senger also considered other trajectories, including flights with a landing on the territory of a country friendly to Germany, as well as with the loss of a car after a bombing. In the latter case, the bombing had to be carried out from a dive at an altitude of less than one kilometer. Then, after the bombing, the pilot had to bring the bomber into climb and have time to eject. It was assumed that after landing at a distance of several kilometers from the place where the bombs fell, the pilot E could be captured. E

Until the end of the war, E. Zenger's concept did not have time to be brought to life, since it required a huge volume! work on the creation of appropriate starting devices, the creation of powerful rocket engines, the study of problems associated with the heating of structural elements of the aircraft and its s! when flying at hypersonic speeds, developing the project itself. bomber, the development of navigation aids, the development of hydrosonic bombs, etc.

10. MISTEL PLANTS

In 1941, KIM began research into the possibility of using composite aircraft (the so-called “Mistel” scheme) as projectile aircraft. After initial scrutiny, the KI/M Technical Department dismissed the idea on the grounds that there was no practical application for it. However, already a year later, on the instructions of the ministry, the OE$ began studying the features of the flight of a bundle from a glider and the control unit installed on its back. Nervously, the experiments were carried out with the BEZ 230 airframe, and the KI 35, Bÿ 56 and VG109E were used as control aircraft. As a result, a decision was made to start flight tests of an experimental combination of a projectile aircraft, into which the Ti 88A was converted, and a BE 109E control aircraft. The positive test results of this bundle became the basis for the adoption of a program code-named "Beethoven". Within the framework of this program, in July 1943, the Junkers firm was given an order to prepare 15 copies of the Mistel-1 combat system (Ji 88A. + BE 109E).

In the spring of 1944, as part of the 4th group of the KS 101 bomber squadron, a special squadron was formed, which began to receive Mistels. No. 88A-4 with a conventional nose was used for training the flight crew, but almost all equipment was removed from the cockpit, training vehicles were designated "Mistel 5-1". The nose of the Mi 88A-4 was easily detached with the help of quick-release bolts and was replaced by a warhead <3800 kg shaped charge. mouth fighter

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Jo VBA + BE 109E

poured from above on two front rigid struts and one rear spring-loaded strut. Two options for the combat use of the bundle were envisaged. According to the first variant, takeoff and flight to the target were carried out only with the engines of the lower vehicle running. The engines of the upper machine were started when approaching the target, after which the pilot did not put the bunch into a gentle dive and undocked the control plane. The in-flight undocking mechanism was as follows. The pilot released the rear control plane strut, which, leaning back along the bomber fuselage, pressed the limit switch, which opened the locks of the main struts. The freed bomber dived on the target, and the control aircraft went to the base. The second option provided for the joint operation of the engines of both aircraft until the moment of undocking, while the engine of the upper aircraft was fed with fuel from the carrier. On the night of June 24, 1944, the Mistelei-1 squadron from EU / KO 101 attacked the Allied ships at the mouth of the Seine for the first time.

. Other variants of the Mistele were also developed. For example, "Mistel-2" was a bunch of ÿi 886-1 with Ru 190A-6 or Ru 190ÿ-8. In 1944, 75 Guy 880-1 bombers that were under repair were converted into Misteli-2. The first sample took off in November of the same year, in total it was planned to deliver 125 Mistelei-2. Mistel-3 was a modernized version of Mistel-2, which had a lower aircraft under the fuselage

additional landing gear, reset after takeoff. The strengthening of the landing gear was caused by several Mistelei-2 accidents due to strut failures during takeoff from poorly prepared airfields.

In October 1944, the 4th group of the KS 101 bomber squadron, which was armed with 60 Mistels, was transferred to the 2nd group of the KS 200 bomber squadron to participate in the planned March 1945 battle. Operation Iron Hammer. The essence of the operation which was developed by Professor Steinman from KIM back in: 1943, consisted in a one-time bombing of power plants located in the European part of the Soviet Union in order to paralyze its defense industry. For hitting hydroelectric

The stations developed special drop bombs Söttegraop, which were supposed to be delivered by the flow of water to hydroelectric turbines and put them out of action. The implementation of Operation Iron Hammer required about 100 Mistels. According to the scenario of the planned operation, the Mistels were supposed to take off from airfields in East Prussia, but in March these airfields were captured by the advancing Soviet troops. attacks on bridges on the rivers Oder, Neisse and Vistula. Since April, the bomber squadron KO 30, partially re-equipped on the Misteli, has been connected to these hostilities.

A variant of the Mistel-3 was developed, intended for reusable use as an ultra-long-range one. fighter. At the same time, the lower aircraft was piloted by its own crew, equipped with a radar and a MO 131 machine gun in the rear of the cockpit, two drop fuel tanks with a capacity of 900 liters each were suspended to achieve maximum range.

"Mistel-4" was a bunch of L 886-7

and the Ta 152N fighter. Until the end of the war they were built

250 copies, about 50 copies were captured by the allied forces in the area of Mercerburg.

"Mistel-5" was a bunch of stuffed with 2000-kg explosives of the lower aircraft Ta 154A and the upper control aircraft E 190A-8. The development of this bundle began in the summer of 1944, it was intended to attack the formation of bombers. It was assumed that after aiming at the formation of bombers, the pilot would target the Ta 1544, the undermining of the bomber should have been carried out by radio. | Six 154A-0 aircraft were re-equipped for projectiles, which were undergoing flight " Shin Ta tests. However, during the tests it turned out that due to the small difference in weight between the control aircraft and! by a projectile, the process of their undocking is provided! there is a danger to the pilot. !

In addition, a bunch of two aircraft was being developed? Ta 154, while the control aircraft towed the aircraft - 1 projectile in a rigid tow. When approaching the formation of a bomber-{

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The pilots' tug was dropped, and the Ta 154 aircraft continued to fly side by side, connected by a control cable. Immediately before the attack, the cable was unhooked. The project of this bundle was not implemented.

Projects "Mistelei" were developed, which included

ryh provided for jet aircraft. One of these projects was developed in the fall of 1944 by Blom & Voss. The project envisaged that an MOVR aircraft, consisting of a small control aircraft in which the pilot was lying down, and a rocket, would be installed on the back of the Ro 217 aircraft. Both the control plane and the rocket were equipped with ramjet engines. It was assumed that the entire “coupling would be delivered to a given area on a Do 217 aircraft. At a distance of about 300 km from the target, the pilot of the control aircraft started the engines of his coupling, after separation from the carrier aircraft, the coupling had to continue flying independently. When pointing at the target, the pilot separated the control aircraft from the missile and returned to the base with a ski landing. MSKR: wingspan - 6 m, area - 6 m?; aircraft length Characteristics - 8.m; rocket weight - 1200 kg; control aircraft weight - 500 kg; fuel weight - 2300 kg; total take-off weight - 4 thousand kg; range, taking into account delivery by the carrier aircraft Ro 217 - 1000 km.

The At E.377 + Ag 234 hitch project was developed by Arado together with Rheinmetall Borsig in the fall of 1944. The Ag E.377 projectile was designed to attack large ground targets and ships. The bomber Ag 2348 or Ag 234C, mounted on top of the projectile aircraft, was envisaged as the control aircraft. E.377 had an all-wood construction, 2,000 kg of a brisant charge Tpa-1ep 105 was placed in the bow. As another option, the installation of a standard 5C 1800 bomb was considered. kg of incendiary liquid, it also served as a ballast to maintain alignment. The wing housed the fuel tanks, which were used as additional | | aircraft control tanks. The fuel from the E.377 tanks was squeezed out by compressed air taken from the compresso

ra power plant carrier aircraft. The tail unit of the projectile consisted of symmetrically located upper and lower fins with horizontal empennage mounted on the upper keel. Takeoff hitch Ag E.377 + Ag 234 was carried out with the help of a resettable launch cart, similar to the one that Rheinmetal-Borsig developed for the Ag 234A. But since the hitch turned out to be heavier, the cart was reinforced and had additional wheels, rocket boosters and a brake parachute. Upon reaching the target, the E.377 undocked from the control aircraft with the help of pyrobolts, after which it flew towards the target in an autonomous flight. The control of the steering mechanisms was carried out with the help of a special device, which was remotely controlled by the pilot of the carrier aircraft. The control aircraft returned to base after completing the mission. ”

„Characteristics of Ag E.377: wingspan - 14.4 m, area - 27 m?; aircraft length - 10.9 m; fuel weight - 4500 kg; takeoff weight - 10 thousand kg; the total take-off weight of the Ag E.377 + Ag 234 hitch is 20 thousand kg; maximum speed - 650 km / h; range - 2 thousand km.

A second version of E.377a was developed, equipped with two VMU 003 engines. It was supposed to use the He 162 “people's fighter” as a control aircraft in combination with it. none of the versions have been built.

“Ag E.377 + Ag 234C

The Siebel firm proposed its own version of the ship-based Mistel for attacks on large formations of ships, dams, dams, etc. The upper plane was the Yem 190, and the lower one was a glider with four rocket engines in the tail section of the fuse - lie down. The wingspan of the glider was 20 m. Two options for using this hitch were proposed. In the first version, the hitch was supposed to take off from an inclined ramp installed on the deck of the ship. After aiming at the target, the pilot of the control plane unhooked the glider, which swooped down on the target. In the second version, the hitch was lowered into the water with a crane. The glider, the wing of which had outer sections bent upwards, in this case played the role of a torpedo boat, controlled by the pilot of the Yem 190 aircraft mounted on top. The pilot started the engine of the upper aircraft,

and the hitch floated in search of a target. After detecting the target, the pilot turned on the rocket engines of the glider, and after reaching a certain speed with the hitch, undocked the control plane from the glider and took off from it. For this purpose, the glider was equipped with inclined guides, which served as a take-off ramp,

Firm "Messerschmitt" proposed to use in conjunction

. fighter Me 262. In one of the options, he was supposed to make a scene with a converted Ti 287 bomber. In another option, it was proposed to use the Me 262A-1 + Me 262A-2a / 02 hitch. The upper plane was a modified version of the Me 262A-2a / 02, in which the nose was glazed, and in the cockpit there was an additional lying place for the pilot -

Ar E.377 + He 162 137

"Mistel" - rocket launcher

"Mistel" - zkranoplon

Me 262A-1 + Me 262A-20/02

mana scorer. The lower Me 262A-1 aircraft was converted into a projectile aircraft: all weapons and the cockpit were removed from it, and the warhead and control equipment were placed in the vacated volume. Until the end of the war, none of the proposed Mistel jet projects was implemented.

11. MANNED AIRCRAFT PROJECTS

In the last goal and a half of the war, the German high command turned to the idea of using manned projectiles against ships and well-defended ground targets on enemy territory. The number of dead Japanese kamikaze pilots by the end of World War II exceeded 5 thousand. I

However, unlike the Japanese kamikaze pilot, the German pilot was instructed to leave the cockpit of the aircraft with a parachute after pointing the projectile at the target. Moreover, the technical requirements of KIM for the development of a manned projectile aircraft contained clauses on the obligatory armoring of the cockpit and equipping it with means of quick escape, among which | The ejection seat was also considered. At the same time, it was assumed that after splashing down or landing, the pilot would be picked up by special rescue squadrons, which were armed with E1 156 light aircraft. In practice, the pilot's chances to leave the cockpit at speed. diving, reaching 800-900 km/h, and landing safely (or splashing down) were rated by many German experts as one in a hundred. Nevertheless, zealous supporters of this idea were the well-known pilot and researcher Hanna Reitsch. Many senior officials from the backlash command

· and "saboteur No. 1" of Germany, SS Hauptiturmführer Otto Skorzeny.

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The Waffe resented the suicidal nature of the proposed weapons, believing that guided missiles such as H$293 or Mistels could more effectively fulfill the same role. But in the paranoid atmosphere of the time, no one dared to openly criticize the projects of Hitler's favorites.

In the fall of 1943, Luftwaffe officer Tauptmann Heinrich Lange led a small group of volunteer pilots to practice the technique of using "non-standard" attacks on ground and

surface targets of the enemy, including attacks with the help of manned projectiles. In October 1943, Lange met with Hanna Reitsch and Dr. Benzinger, head of the German Institute for Aviation Medicine. They developed specific proposals for the use of manned projectiles, which were then discussed with Deputy G. Goering 9. Milch. Hanna Reitsch was instructed to present the final version of the proposals personally to Hitler, which was done on February 28, 1944. The result of consideration of these proposals was the order to create an experimental 5th squadron as part of the 200th bomber squadron. 5

The KS 200 squadron, equipped with captured aircraft, carried out operations to send secret German agents over the front line. The 1st group of UKS 200 was responsible for the delivery of Abwehr agents. The largest number of agents was abandoned in July 1944 (260 people), and in total from June 1944 to March 1945 600 people were abandoned. The 2nd group (NIKO 200) was mainly used to drop sabotage or assault groups. The 5th squadron 5./KO 200 was intended to practice and carry out "non-standard" attacks, it received the unofficial name "Leonidas Staffel". This was reminiscent of the hero of Thermopylae, the Spartan king Leonidas, who died along with his detachment of 300 people in a battle with the thousands of troops of the Persian king Xerxes. The flight personnel of the 5th squadron, whose commander H. Linge was appointed, numbered about 70 people, 30 of them were members of O. Skorzeny's team. The leadership of all work related to the formation of groups of suicide pilots and their development of attack methods was entrusted to the Chief of Staff of the Luftwaffe, General Korten.

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The Luftwaffe high command initially considered the Me 328 aircraft developed by Messerschmitt for the role of a projectile aircraft. However, the tests carried out showed that the chances of a heavily loaded Gy/190 to break through the barriers of the NVO system of guarded objects are small. Therefore, we decided to urgently develop a specialized small disposable fighter with a warhead (aircraft projectile) launched from a carrier aircraft in the air or from a ground catapult. Disposable aircraft projects were developed by several companies.

Me 328. In the summer of 1944, the Messerschmitt firm, trying to save the program, proposed using the Me 328V in a non-engine version as a manned aircraft.

torpedo towed by aircraft Jo 88 (Ti 388 or

Not 177). Such a variant of combat use at that time

worked out the squadron 5. / KO 200. Me 328V with the installation

The warhead stored in the bow compartment instead of fuel tanks was supposed to be delivered by a tugboat to the area where the enemy ship was located and, after uncoupling in a gliding flight, approach the target. After that, the pilot aimed the plane at the target, transferring it to pikiro.

vaning, and, having shot off the tail section of the fuselage, left.

parachute cabin. After splashdown, the pilot was supposed to be picked up by a special rescue team.

The Me 328 program was terminated after the adoption of the re-.

decision about the alteration for the KS 200 batch of cruise missiles E! 103 into the Reichenbert manned projectile (E! 1036).

OV R.S/R.E/R.E

Daimler-Benz has developed a project for speed and

new carrier aircraft S$ÿpeShbotget (gareg, similar

option OV R.V. The aircraft was designed to carry: under the wing of 5 OB R.E projectiles or 6 aircraft:

Comrade Snaridov OV R.E. A weapon system of a similar design

we was first developed in the USSR in the 30s. (airplane :

"Link" B.S. Vakhmistrov). 142

ooh sez.

OV R.E

Aircraft projectile OV. P.E was equipped with a Ne5 011 turbojet engine installed under the fuselage in the tail section. The landing gear was absent, in the forward part of the fuselage there was a combat charge weighing 2 thousand kg. It was assumed that after aiming at the target, the pilot would leave the cockpit by jumping out with a parachute.

The aircraft-snare OV R.E, unlike the previous project, used the BMÿ 018 turbojet engine. It was installed above the cockpit, which gave the pilot a chance in an emergency to make an emergency landing on the fuselage. In the forward part of the fuselage there was a charge of 3,000 kg. After aiming at the target of his aircraft, the pilot dropped the hatch located under him, fell out of the cockpit, and then descended by parachute. Until the end of the war, the R.S / R.E / R.E project was not implemented.

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OB RE

Characteristics of OV R.E: wingspan - 8.5 m; aircraft length - 9.2; height - 3.2 m; maximum speed - 1000 km / h.

Characteristics of OV R.E: wingspan - 9 m; aircraft length - 12.96 m; height - 3.0 m; maximum speed — 1050 km/h.

Ta 154

In mid-May 1944, the Focke-Wulf firm submitted proposals to the KIM for the conversion of fifteen Ta 154A fighters into a manned projectile Ta 154A-0/1)2 Rshklegsÿoger (“Line Breaker”). However, KIM issued an order for the conversion of only five machines. According to the proposals, the nose of the production aircraft, including the cockpit, was converted into a warhead to accommodate 2,000 kg of explosives. In the middle

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Ta 154 with catapult

parts of the fuselage should. be equipped with a primitive cockpit for the pilot, in which an ejection seat was installed. When approaching the formation of allied bombers, the pilot had to direct his projectile at the target, turn on the autopilot, and catalult at the last moment.

The first machine, the Ta 154 Rikersgoger, which became the prototype for the new version, took off for the first time on 5 August 1944. On the same day, it was destroyed during an Allied air raid. Four more vehicles were built by October 1944, however, none of the built projectiles was used in combat operations.

Characteristics of Ta 154A-1: crew - 2 people; power plant — 2 Tito 2138 4 engines with a capacity of 1750 hp each. With. (1305 kW); wingspan - 16.3 m, area - 31.4 m ?; aircraft length - 12.55 m; height - 3.6 m; empty weight - 8940 kg; maximum takeoff weight - 9560 kg; maximum speed - 646 km / h at an altitude of 7100 m; flight range - 1350 km (with two 300-l external tanks - 1850 km); practical ceiling - 10 thousand m; climb time to a height of 8 thousand m - 14.5 minutes; armament — two MC 151 cannons and two MK 108 cannons.

in 1038 2

At the OR$, on the instructions of the Commander-in-Chief, a project was developed for a manned projectile "Reichenberg" based on a cruise missile ÿÿ 103. In total, four variants of the aircraft were developed: the first three were intended for testing and training of flight personnel, the fourth (" Reichenberg-GU") - for combat use. Delivery of "Reichenberg-GU" should

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A 1038 (vrrianta)

ABOUT

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was carried into the combat zone under the wing of the He 111 carriers.

"Reichenberg-GU" differed from I 103 only in the installation of the cockpit in front of the engine air intake (instead of the compartment with compressed air cylinders) and the presence of wing wing winglets; The cockpit was equipped with a pilot's seat and a dashboard with a sight, altimeter, attitude indicator, speed indicator and clock. In addition, a gyrocompass and an electric battery with a converter were located in the cockpit. The aircraft was controlled using a conventional handle and pedals. The cockpit canopy opened to the right, the windshield was armored.

The first prototypes of the Reichenberg did not have a pilot rescue system. On serial machines, it was supposed to install the simplest emergency escape system, similar to the system used on the RV R.E projectile or on the Henschel Nv 132 jet attack aircraft. When the ejection lever was actuated, the lock was opened and the don hatch, after which the pilot fell out of the cockpit.

The Reichenberg prototype was manufactured at the Henschel plant in Berlin Schoenefelede. Flight tests of the machine began in Rechlin in September 1944. The pilot during the spin due to the high speed of landing on first. the flight received serious damage to the ventral ski.
During the second flight, the canopy was torn off, and again the pilot was seriously injured during landing.
After finalizing the design of the machine, the tests continued, several flights were performed by Willy Fiedler, a test pilot of the Fieseler company. Hanna Reitsch, who tested the third experimental machine, completed the first flight successfully, despite the damage received by the machine during uncoupling from the carrier aircraft. However, the second flight of the same machine ended in an accident due to the loss of sand ballast: the plane crashed, but Reitsch survived.

Soon a two-seat training sample without the Reichenberg-P engine was built, and in November a two-seat apparatus with the Reichenberg-PI engine was built. During the second test flight of Reichenberg-NI on November 5, 1944, the tip of the left wing broke off due to strong vibration from the engine, but the test pilot

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Heinz Kensche managed to leave the cramped cockpit with a parachute. This accident demonstrated the enormous difficulty of leaving the vehicle even for a highly skilled pilot.

tester.

At the end of 1944, the training of instructors for training flight crews to fly on the Reichenberg-GU began, and production facilities were prepared near Dannenburg for the conversion of E! 103 into manned Reichenbergs. As already mentioned, the Reichenbergs were intended for the Leonidas Staffel of the KS 200 squadron.
Of the 70 volunteer pilots, approximately half completed training until the end of February 1945, but then the training was suspended due to lack of fuel. During a test flight in Rechlin on March 5, test pilot Kenshe's luck turned away - he died after the skin from the wing of the Reichenberg was torn off while performing a dive mode.

This catastrophe broke the patience of the commander of KS 200, Lieutenant Colonel Baumbach, who was an opponent of the Reichenberg program. Baumbach turned to the Minister for Armaments and War Industry, Albert Speer, for help. On March 15, Speer and Baumbach visited Hitler, and Schneer was able to convince the Fuhrer that suicide was not in line with the traditions of the German military. In the end, Hitler agreed with these arguments, and on the same day Baumbach ordered the disbandment of the suicide pilot squadron. By that time, more than 200 Reichenberg projectiles were already in the Luftwaffe depots in Dannenberg and Pulverhof, but none of them was ever used in combat.

Curiously enough, the Dannenberg plant was visited several times by Japanese officers in order to familiarize themselves with the process of building the Reichenberg. German: What technological assistance was provided in the development of: Japanese analogue of "Reichenberg" - kamikaze aircraft | firm "Kavanishi" "Bayka", which was not finished at the end of the war.

Characteristics of EE 103 ("Reichenberg-GU"): scope! wings - 5.7 m; aircraft length - 8 m; takeoff weight - * 2250 kg; warhead weight - 850 kg; maximum speed; growth - 800 km / h; flight range (when dropped from a height of 2500 m) - 330 km; flight duration - 32 min

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12. HELICOPTERS AND GYPOS

The development of the helicopter industry in Germany is associated with the names of Antoni Flettner and Heinrich Focke.

Anthony Flettner started working for Zeppelin in 1905. In 1930 he built a helicopter with a two-blade propeller, which was rotated by two Anzani engines with small propellers mounted at the ends of the blades. In 1936, a prototype double aztozhira E was tested! 184, intended for the fleet as a reconnaissance and anti-submarine vehicle, the prototype of the EI 185 helicopter autogyro was next. Light helicopters #1 265 and E! 282, as well as the helicopter E! 339, capable of carrying 20 people.

Since 1931, Heinrich Focke, one of the founders of the Focke-Wulf company, has been engaged in research on rotorcraft. In 1936, he built the Eu 186 autogyro, and the following year the Ech 61 helicopter. The Eu 61 helicopter had a Siemens $ÿ 146 engine and a fuselage from the Ech 44 training aircraft. A three-bladed propeller was installed on each side of the fuselage on a truss structure. with a diameter of 7.5 m. In total, two Bu 61 prototypes were built - U 1 (O-EVU) and U2 (0-EKKA). The flight tests were successful, in particular, Flight Captain Hanna Reitsch publicly demonstrated the helicopter's flight performance indoors at the Reschkenatd Nei Palace in Berlin.

In 1937, G. Focke left the Focke-Wulf company and founded, together with the famous German pilot Gerd Akhgelis, a new company, the Focke-Ahgelis Flugzeugbau

GmbH in Geukenkamp near Delmenhorst. Focke-Ahgelis developed a whole series of experimental models of helicopters, including the Ea 61, the first flight of which took place on June 26, 1936. In subsequent years, this experimental machine repeatedly set records for altitude, speed and flight range. In 1938, the design of the passenger helicopter Ra 266 began. difficulties, although the production of components began. During the war, the firm developed a number of original projects, including the Pa 269 twin-engine VTOL fighter with rotary engine nacelles.

R. Schmidt from AES (Airesheshe Eeknpgiavrezejvsvay) worked since 1933 on the creation of a helicopter, which was intended to be used as an observation platform or platform for an artillery spotter. The device could be transported and launched from a truck. It had two counter-rotating coaxial propellers powered by an electric motor. The latest modification of the device could lift a load weighing up to 1250 kg, but the device was not built in series.

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Eo 223

In August 1940, the Fokke-Ahgelis company developed the Gga 223 Pgashe (“Dragon”) transport helicopter, which was a modification of the six-seat civilian Ra 266 helicopter.

The pilot and observer were located in the glazed cockpit in the forward part of the fuselage, behind it was the cargo compartment. The door to the cargo compartment was located on the starboard side. In the middle part of the fuselage there was a VMU 301K engine with a power of 1000 hp. s., which rotated two propellers with the help of long shafts mounted on tubular struts. The helicopter fuselage was welded from steel pipes and sheathed with fabric, except for the engine area, where the sheathing was made of aluminum alloy. The helicopter was equipped with an electric winch, under the fuselage it was possible to hang an additional 300-liter of fuel

ny tank or two 250-kg bombs. In the forward part of the fuselage there was one MS 15 machine gun.

But the results of flight tests of the prototype a were issued a contract for the construction of 30 pre-production machines. Serial production began in 1942. After 10 machines were built at the company's factory in Bremen, due to increased bombing, production was transferred to Laupheim near Stuttgart. 7 more cars were built there. However, by the autumn of 1942, due to very heavy bombardment by British aircraft, only two copies of the ÿÿ 223 survived. These helicopters were handed over for military trials. During these tests, the helicopter showed quite good performance, for example, it delivered several 75-mm cannons to mountain shooters at a position located at an altitude of 2 thousand meters.

By 1944, only eight GA 223s could be built in Heyenkamp and one more in Berlin. In 1944, two helicopters were stationed in Münster as rescue vehicles, which could carry not only crews, but even aircraft components. In one case, the engine of the Eu 190 aircraft, which weighed 1284 kg, was “moved to

distance 32 km. As of April 1945, the 40th Transport Squadron was armed with three copies of ÿÿ 223. By the end of the war, one of them was destroyed, and two were captured by American troops as trophies.

Characteristics of ÿÿ 223: fuselage length - 12.25 m, height - 4.35 m; screw diameter - 12 m; the distance between the axes of the propellers is 12 m; number of propeller blades - 3; empty helicopter weight — 3175 kg; maximum takeoff weight - 4315 kg; maximum speed - 175 km / h; cruising speed - 121 km / h; dynamic ceiling - 4880 m; range - 437 km ..

At the beginning of the war, the Kriegsmarine headquarters planned to equip the Type XI submarine under development with a reconnaissance aircraft. This idea itself was not new; experiments of this kind were carried out back in the First World War. In connection with the request of the fleet, KIM in early 1940 issued a contract to Agado for the development of an Ag 231 reconnaissance aircraft capable of being based on a submarine. A

Single-seat loplavkovy aircraft Ag 231 equipped-. Xia engine "Hirt" HM 501 with a power of 123 kW and had a simple collapsible design. Wing - with a kink in the central part so that the left console was slightly higher than the right one. This made it possible to fold the consoles back one above the other when disassembling the aircraft. In disassembled form with the floats removed, the machine fit in a container with a diameter of 2 m. The whole process . dismantling the aircraft and placing it in a container small about water and lifting ve after 6 minutes, assembly and preparation of the aircraft for launching 1 took the same amount of time. 1

The first prototype Ag 231 U! took off early | 1941 Tests reveal insufficient STABILITY | aircraft on the water, as well as the impossibility of taking off at high speed! wind speeds over 20 knots. Therefore, when the Kriegsmarine: refused to develop the Type XI boat, KEM stopped 'further work on the At 231, despite the fact that it was built! all six experimental machines ordered have already ended. h

1 152 4

However, the fleet needed reconnaissance vehicles. for Type IX submarines already in service. Given the new circumstances, KEM issued an order to the Fokke Ahgelis company for the construction of a reconnaissance gyroplane. In 1942, the Fokke-Ahgelis company presented a project of a single-seat autogyro ÿÿ 330 Vasÿvÿÿÿge (“Wagtail”) towed on a cable.

Its design was extremely simple: a longitudinal pipe, reinforced. in front of the truss with a pilot's seat fixed on it, tail and a small instrument panel in front, and a vertical tube with a three-blade main propeller and a parachute. The tail unit, made of pipes and sheathed with fabric, consisted of a stabilizer and a keel with a rudder. The propeller blades had a tubular spar, plywood ribs and nose, and fabric sheathing. The entire power frame of the apparatus was made of steel. At

For takeoff and landing on the deck, steel quick-release skids were provided. In special cases, for example, when operating the apparatus on land, a wheeled chassis could be installed. The control of the apparatus was carried out with the help of a handle and pedals, just like on an airplane. On the dashboard there were indicators of speed, the number of revolutions of the propeller and an altimeter. E

On the submarine, the autogyro was stored disassembled in two vertical cylindrical containers with an internal diameter of 600 mm. The assembly of the apnarat in preparation for the flight was carried out at the launch site in 7–8 minutes. Before takeoff, the pilot manually spun the main rotor with the help of a launch cable. When the required speed was reached, which was composed of the speed of the submarine and the speed of the wind, the apparatus took off, unwinding the towing cable from the winch (like a kite).

The winch provided a device that could cut the cable in the event of an accident. During the flight, a telephone connection was maintained between the apparatus and the boat. There were three points of contact located at the pilot, winch operator and submarine commander. After the end of the observation, the aircraft pulled towards the launch pad. If necessary, the device during the flight. could free himself from the cable and produce

free landing. In case of malfunctions in flight, it was possible to reset the propeller by pressing the emergency lever, which was located above the pilot's head, and unhook the cable. After that, the pilot descended together with the aircraft on a parachute, which ensured a safe descent from a minimum height of 40 m. With a towing cable length of 300 m and a flight at a speed of 35 km/h

· to a height of 100 m, and at a speed of 80 km / h - to 220 m. At the same time, the horizon was viewed at a distance of about 35 and 53 km, respectively.

In total, until the end of the war, the Weserflugzeugbau company near Bremen built 200 copies of the Gha 330. However, the combat use of the gyroplane sometimes caused great inconvenience - the boat could not carry out an emergency dive if the gyroplane was in flight. For this reason, the Ea 330 was unpopular with submariners; it was used in small quantities only where the enemy had little anti-submarine forces. Under these conditions, the use of the gyroplane was more useful and safer. The first production gyroplane was used on a submarine in the South Atlantic in the middle of 1942, and from February of the following year, Type IX 02 submarines operating in the Far East were equipped with Ea 330 vehicles.

Characteristics of Ea 330: length - 4.47 m; height - 1.67 m; main rotor diameter - 7.3 m; the volume occupied by containers in the submarine is 2 m3; empty weight - 75 kg; flight weight - 175 kg; flight speed range (ground speed of the boat + wind) — 35—80 km/h.

I 282 x

The Flettner firm completed in July 1940 the project of a two-seat reconnaissance helicopter B 282 Koirp; made according to the scheme with two intersecting screws. VMU-Vgato 50 14A engine, 160 hp. s, was located in the middle part of the fuselage, the power frame of which was welded from steel pipes. Sheathing was mainly fabric, with the exception of the engine area, where aluminum alloys were used. The landing gear was tricycle with a steerable nose wheel. In total, 30 experimental and 15 pre-production machines were ordered. Production<

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The activity was organized at the company's main plant in Johannisthal (a suburb of Berlin) and in Bad Tolz. Test flights began in 1941, and already at the beginning of the next year, the fifth experimental machine in 282U5 was used to practice take-off and landing on a 4 x 4 m platform of the cruiser Cologne. In October the same. Two years later, two helicopters were delivered to Trieste for military trials. From November 1942 to February 1943, the sixth experimental vehicle (code CE + YE) was used for reconnaissance in the Aegean Sea, based on the Yugaspe mine layer adapted as a helicopter carrier. Another helicopter (CJH-C code) was on the shore as a backup reconnaissance aircraft. By 1943, about twenty E 282s had been completed: the first two had closed cabs and were designated E! 282A-1, while the rest of the machines had open cabs and were designated ÿÿ 282ÿ-!. In the Mediterranean, Aegean and Baltic Seas, the ver- was used in the search for enemy submarines, after detecting a boat, he called in an anti-submarine aircraft to attack. In 1944, an independent subdivision of helicopters were used to protect convoys. KI 282 also artillery spotters was created, which included three KI 282 and three ÿÿ 223. Sometimes EI 282 was used individually in combat operations. At the end of February 1945, observation helicopters ÿÿ 282 were able to determine in time the beginning of the attack of the Soviet troops in Pomerania. However, due to the weakness of the German army units, their communication could not stop the further advance of the Soviet troops. Several GI 282s were stationed in the suburbs of Berlin and worked as art spotters. Over time, they all became victims of Soviet fighters and Soviet anti-aircraft artillery. Despite the fact that the company was ordered 1000 copies of H 282, only 24 machines were built before the end of the war. After the end of the war, the allies captured three helicopters in flying condition: two of them went to the United States, and one to the USSR (for a number of years it was used as a training aid at the Moscow Aviation Institute). Characteristics of GI 282:

fuselage length - 6.6 m, height - 2.2 m; screw diameter - 12.0 m; number of propeller blades - 2; weight of an empty helicopter - 760 kg; maximum

take-off weight - 1000 kg; maximum speed - 150 km / h; dynamic ceiling - 3300 m; range - 300 km (with 1 pilot) and 180 km (with a crew of 2 people).

M 342

The Yp 342 helicopter with a torqueless rotor was developed by the Austrian baron Friedrich von Doblehoff in collaboration with the engineers Laufer and Stefan and built by UME in Wiener Neustadt.

The prototype of the Mp 342U1 helicopter was launched in October 1942. The Umaneg Misron engine with a capacity of 60 hp was used as a power plant. s., which served as a drive for the Ageiv compressor. The air compressed by the compressor together with heated fuel was introduced into
hollow lo-

· rotor blades, the resulting mixture was burned in the chambers at the ends of the blades and dragged the rotor into rotation. The first flight tests were successfully carried out on the factory floor. Several prototypes were built at a factory in the Austrian city of Celle, at the end of the war they fell into the hands of the Americans.

Neuoyu

Austrian Paul Baumgartl worked on the creation of a miniature backpack helicopter. His first device under. The name Neioyu I appeared in 1941, but the test results were disappointing.

The next development was the NeNoyu IP / 57 apparatus. equipped with two counter-rotating screws, . powered by Agris Av 8 engines. Each propeller had only one blade, therefore, for balancing on a short; a counterweight was installed at the end of the blade. When tested; yakh it turned out that the engine power is not enough for the implementation of the flight. Therefore, Baumgartl created the following: an apparatus called NeNoyu 1,1/59 with a 16 hp engine. With. This device required a lot of physical strength from the pilot, since
poshly- the empty weight of the device was 35 kg. "The total takeoff weight of the device was 120 kg, several flights were made during the tests, but the "urgent fighter program" interrupted this work. .

jelly.

13. PLANES VERTICAL. TAKEOFF. AND LANDINGS

\ R.1003

In 1938, the Weserflug company, under the guidance of designer Simon, began the development of a vertical take-off and landing aircraft (project No. ÿ.1003). In quality. OB 600 was used on the engine, two propellers were rotated

mi 2.1003 157

with a diameter of 4 m, mounted on the rotary end parts of the wing. During take-off, the rotary parts of the wing turned up with the propellers, after installing them in their usual position, the aircraft switched to horizontal flight. The project was not implemented.

An interesting fact - in the Soviet Union, work on the study of the aerodynamics of the tiltrotor was carried out in 1935-1936. under the guidance of Professor B.N. Yuryeva. In 1936, a student at the Moscow Aviation Institute

Kurochkin defended his graduation project for a twin-rotor VTOL fighter with a rotary wing. The fighter, named "Falcon", had the following design characteristics: wingspan - 5.8 m, area - 9.28 m?: aircraft length - 7.55 m; screw diameters - 4 m; takeoff weight - 1850 kg; engine power "Hispano-Suiza" 12 JBB5 - 860 liters. With.

- Characteristics No. R.1003: wingspan - 11 m (with propellers) and 7 m (without propellers); aircraft length - 8.3 m; height - 3.1 m; takeoff weight - 2 thousand kg; maximum speed - 650 km / h. R

ga 269 V

In 1943, G. Focke developed a design for the Ra 269 tiltrotor aircraft. The OV 601 or OV 605 engines were located on the wing consoles of the aircraft, each of them drove a pusher propeller of large diameter through a long shaft.

ra. During takeoff and landing, the shaft turned vertically down; during horizontal flight, the shaft folded into a wing against the direction of flight. The main landing gear folded forward into the nose of the fuselage, the rear landing gear into the tail. The project was not implemented. Characteristics of ÿÿ 269: wingspan - 10 m; aircraft length — 8.9 m; maximum speed - 600 km / h.

Rm TneByode!

In September 1944, at the Focke-Wulf company, designer H. von Halen designed a vertical take-off and landing aircraft, the so-called Em TperPive!. The vehicle, armed with two MK 103 cannons and two MS 151 cannons in the forward fuselage, was intended for interception. A feature of this aircraft was a three-bladed rotor rotating around the fuselage, at the end of each blade was. A ramjet designed by Otto Pabst, who worked in the gas-dynamic department of the Focke-Wulf company, was installed. The engine, developed back in 1941, had a diameter of about 0.686 m, a length of 1.715 m and developed a thrust of 839 kgf: It could run on non-deficient fuels, including coal dust. Fuel was supplied to the engines by centrifugal force.

The aircraft stood vertically on the ground on the landing gear, which consisted of the main central wheel in the rear fuselage and four additional struts with small wheels mounted on a cruciform tail plumage. In flight, additional racks folded back, resembling a tulip bud. The cockpit was located in the forward part of the fuselage, the pilot was located in it. lying. Takeoff was carried out as follows. The rotor was spun with the help of a starting engine installed inside the fuselage, or with the help of launch accelerators, fixed under each of the engines, to create lift during takeoff, the blades were set at a certain angle. After reaching the required velocity head, the ramjet was turned on. In level flight, the angle of installation of the blades decreased, and the aircraft was controlled by tail rudders. Transition

These flight modes presented a great difficulty for the pilot, especially during landing, which had to be carried out with the tail forward. The project was not implemented until the end of the war.

After the war, a similar scheme was implemented in the American experimental aircraft HEU-1 by Convair and HEU-1 by Lockheed, the development of which began in 1950 as part of a competitive program.

Characteristics Eu Tpebitsre !: wingspan (outer diameter of the rotor) - 11.29 m; aircraft length - 9.14 m; take-off weight - 2347 kg; maximum speed - 1000 km / h.

Not U/ozre I

The project of the VTOL interceptor Ne Zhezhre ("Wasp") with an annular wing around the middle part of the fuselage was developed in 1944. The wing was attached to the fuselage with the help of three pylons. An OV RTT, 021 or Ne$ 021 engine with power was installed in the rear part of the fuselage. 2000 l. s., rotating a six-bladed propeller located inside the wing. The inlet of the engine air intake was located in the forward part of the fuselage. The pilot was located in the cockpit while sitting during the horizon

Not Mezre 160

powered flight, so during takeoff and landing he was lying on his back. Two MK 108 guns were installed on the sides of the cockpit. The plane took off vertically. In level flight, additional lift was created by the bent tips of the two pylons. The project was not implemented.

Characteristics of He U / ezre: outer diameter of the wing - 6.2 m, area - 29.7 m2; aircraft length - 6.3 m; take-off weight - 2140 kg; maximum speed - `800 km / h.

Not | fire N A

The Ne Gespe P (Lark) VTOL interceptor was designed from February 25 to May 8, 1945. It was similar to the Uezre project, but with two OV 6050 engines, each of which rotated a three-bladed propeller. The pilot in level flight was located in the cockpit lying down. Two MK 108 guns were installed on the sides of the cabin. The end of the war interrupted work on Gegsve II." E

Characteristics of Non Pershy P: external wing diameter - 4 m; aircraft length - 9.4 m; takeoff weight - 5600 kg; maximum speed — 890 km/h.

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6 M. iv. Kozyrevs

umbrella

14. DISC DEVICES

+ Over the years of the war, in several secret German centers (in Stetzin, Dortmund, Essen, Peenemünde, Prague Breslau, etc.), more than 100 models of unusually shaped aircraft were developed, the best specialists of Germany worked on their creation, and their including: Schumann, Schauberger, Habermol, Mite, Shrich Ver, Italian Belluzzo and others. I must say that all the work on the creation of the German "wonder weapon" was carried out under the auspices of the SS, they were engaged in the Technical Prameni SS (55-E-GU) , and the development leaders had high SS titles. So, for example, the rocket designer, W. von Braun in 1940 received the title of iturmbannführer: SS. To carry out work within the framework of these secret developments, prisoners from the Nordhausen, Buchenwald, Dernau, Mauthausen and other concentration camps were involved in the number of several tens of thousands of people. One of the reasons for the paucity of information about these developments was that. all prisoners were destroyed after the work was done. Evidence of this is the recognition in August 1958 of one of the authors of flying saucers" Viktor Schauberger: "The model tested in February 1945 was built in cooperation with first-class engineers from among the prisoners of the Mauthausen concentration camp. For: so they were taken to the camp, for them it was the end. Other fact: before the retreat of the Germans at the very end of the war, the guards from the SS Sonderkommandos left the concentration camp! "Dora", which contained 30 thousand prisoners,

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who worked at the secret underground plant "Mittelwerk", having shot all the prisoners before that.

However, some prisoners were lucky - they miraculously escaped death. A few years ago, some FBI documents were declassified in the United States concerning German developments of “flying saucers”. One of the FBI agent's reports to his superiors spoke of his contact with a man who, in 1952, moved from Europe to the United States for permanent residence. This man from 1942 to 1945 was a prisoner of one of the concentration camps located on the territory of Poland. In 1944, he happened to see a disk-shaped apparatus that slowly rose to a height of up to 15 m and moved horizontally just as slowly, the loka did not disappear behind the trees. When lifting and during movement, a howling sound emanated from the apparatus. R

Another reason for the absence of more or less completed ” reliable data on "flying saucers" was the destruction at the very end of the war of secret German equipment and related documentation by special SS teams that carried out the order of the highest leader. leadership. :

The whole variety of developed exotic vehicles can be conditionally divided into four main types: disk planes (with piston or jet engines), disk helicopters, vertical take-off and landing vehicles, unmanned disks.

In June 1939, at the German Free-flying Model Aircraft Championship, the discoplan A$ | designs by Arthur Zack. The discoplane model was liked by General E. Udet, who at that time was in charge of the aviation technical service of the German Air Ministry. He recommended the designer to continue work in this direction, promising all kinds of support. After the end of the championship, Zach developed four more flying models of diskoplanes. The last of these models, AZ 5, had a wingspan of 1.5 m and a length of 1.25 m. Zak then developed a manned full-size diskoplan AZ 6. According to some reports, Zak was advised by Professor Lippisch.

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Diskoplan A5 6 was built at the beginning of 1944 in the workshops of Brandis Air Base. It was an aircraft with a round wing and a conventional tail mounted on the trailing edge. The Av 10S-3 engine with a power of 240 hp was located in front. s., rotating the pulling screw, ailerons were spread out along the edges of the apparatus in the rear part, and a take-off and landing flap in the middle of the fuselage. The chassis was three-post: two main non-retractable wheel racks and a rear crutch. The design of the diskoplane was made entirely of lerev, and the cockpit canopy, the pilot's seat and the main landing gear were taken from the BE 1098 aircraft. Munich In the winter of 1944/45, AZ 6 burned down during one of the allied bomber raids.

Characteristics of A5 6: wingspan - 5 m, area - 19.62 m2; aircraft length - 6.4 m; height - 2.56 m; take-off weight — 900 kg. ¢

It is known that there was at least one more diskoplane with engines located in the fuselage behind the cockpit, which drove counter-rotating pusher propellers through elongated shafts. The propellers were installed in cutouts in the rear of the round wing. Two small keels with rudders, ailerons and elevators on the trailing edge of the disk were used as controls.

One of the developed jet diskoplanes had a shortened turbojet engine vertically located in the center of the body; a similar engine was, in particular, created at the Heinkel company. To ensure alignment, the cabin was fed from the air intake channel to the chika was located above the axis of the engine. Part of the air engine, the combustion products, passing through the exhaust channels, mixed with the ejected cold air in the main channel and were thrown out of the flat jet nozzle. The side jet rudders were designed for directional control, the outlet sections of the jet nozzle deflected up or down served as elevators

By the end of the war in Germany, due to constant raids: Allied aviation began to be affected by the lack of take-off;

landing strips for the normal functioning of the air force. Under these conditions, VEM specialists turned to the idea of creating airplanes and helicopters capable of operating from sites dispersed in forests or mountains. Among such aircraft were devices of the "flying saucer" type.

As far back as 1939, G. Focke proposed the design of a vertical take-off and landing vehicle that combined the qualities of an airplane and a helicopter. Anparat was a diskoplane with a triangular tail section of the hull, ailerons, flaps and a keel with a rudder were located on the trailing edge. Inside the case there was a vertical channel in which two coaxial two-blade rotors were installed, rotating through an elongated shaft and a gear box from a turbojet engine. The engine nozzle was connected by channels with two additional combustion chambers (prototypes of afterburners), combustion products were thrown out through the exhaust nozzles of the chambers. On the lower surface of the hull there were opening shutters such as shutters, the cockpit was located in the bow, the tricycle landing gear was retracted into the hull in flight.

The takeoff of the apparatus was carried out as follows. The air flow injected by the rotors exited vertically down through the open flaps, creating lift. By supplying fuel to additional combustion chambers, an increase in the horizontal flight speed was achieved, while the flaps on the lower surface were closed. The directional control of the vehicle was carried out by differentiating the fuel supply to additional combustion chambers. 2 and

Helicopter-disk byt.Oteva PivKiv, developed at the end of the war by designer Andreas Epp. It was supposed to be used as an attack aircraft. The spacecraft had a body in the form of a disk 19 m in diameter, in the center of which there was a cockpit 4 m in diameter. A two-bladed rotor 22 m in diameter with two ramjet engines at its tips was located on the axis of the disk above the body. The rotor was rigidly attached to the axis, like the rotors of gyroplanes. In addition to the main rotor, the Oter Pivkiv apparatus had eight additional Av 8A engines in the body, powerfully

stu 80 l. With. with four-bladed propellers, with each engine installed in a vertical channel with a diameter of 3 m.

The device worked as follows. The initial “spin-up of the main rotor was carried out with the help of launch rocket boosters suspended under the ramjet, and the Az 8A engines were also launched at the same time. When the rotor reached 220 rpm, the ramjet was launched, and the boosters were dropped. The pilot, increasing the thrust of the rotor by changing the pitch of its blades, took off. By changing the thrust of individual additional engines, it was possible to tilt the car in the right direction and carry out horizontal flight. In the event of failure of one of the additional engines, the machine retained sufficient control to complete the flight. When one of the ramjet engines stopped, the fuel supply to the second ramjet engine was automatically cut off and the pilot landed the car in autorotation mode. At low altitude, the car flew using the additional effect of an air cushion. Several models of a 1:10 scale helicopter were tested in wind tunnels and free flight, and before the end of the war four full-size prototypes of Oter Gnoka were built5. The control system implemented in this project was patented after the war in Germany.

The creation of the most exotic apparatuses was associated with the names of Schriver, Mite, Habermohl, Schauberger and Belluzzo. |

Flygkapitan Rudolf Schriever had been a test pilot for the Heinkel firm in Marienech near Rostock on the Baltic Sea since 1940. In parallel with the test work, he was also engaged in the development of aircraft. In the spring of 1941, Schriver designed his first U! ("\" meant "Metsis" - "experienced"). It was a vertical take-off and landing vehicle, which the firm called a “flying cover.” The vehicle had a diameter of no more than one meter, and an electric motor or a piston engine was used as an engine. By June 1942, Schriver's model was already interesting and guaranteed funding from KEM. The construction of a full-size version of the U2 apparatus began„at the beginning

flew, the results were considered sufficient

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1943. The U2 (V-2) apparatus, which was known as Bishrinsizsi, or “flying wheel”, had a diameter of about 7.5 m, one or two Heinkel-Hirt jet engines were used as a power plant. It is possible that Shriver himself carried out flight tests, but due to problems with the engines, the design of the apnarat was soon revised. Shriver and his team are then transferred to Czechoslovakia, where they set about building a large and generally more complex prototype of the US. Although Heinkel produced its own jet engines, work on the "flying wheel" was carried out at a BMW-owned facility located near Prague.

By the autumn of 1944, the tests of the U3 were over. The urgency of the work increased even more, because due to the constant allied bombing, most of the runways of German airfields were destroyed. In this regard, the Luftwaffe urgently needed vertical takeoff and landing aircraft. However, due to an administrative change, the UZ program was abandoned in favor of developing the U7 attack aircraft with a different type of engine.

Engineer Klaus Habermohl joined the Schriever group from VMUU. In Prague, he was to develop a new power plant for the U7, the so-called centrifugal turbojet engine. Unlike a conventional (axial) turbojet engine, in which all its elements are arranged in series one after another (compressor, combustion chambers, turbine, jet nozzle), in a centrifugal engine, the compressor rotates directly around the cockpit mounted on the axis apparatus. That is why the apparatus could have only one form into which such an engine fit - the form of a disk or plate.

The U7 apparatus, designed for a crew of 2-3 people, had a round body with a diameter of 18-21 m with a glazed cabin at the top, a multi-bladed rotor rotated around the body. The rotor was driven by a ramjet mounted on its outer rim. The takeoff of the apparatus was carried out by initial spin-up of the rotor using a ground launcher or launch boosters suspended under the ramjet. Upon reaching a certain number of revolutions,

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“the main engines were killed, and the starting device was turned off or the starting accelerators were dropped. Fuel was supplied to the main engines due to the action of centrifugal forces. The magnitude of the lifting force was regulated by changing the angle of installation of the rotor blades, horizontally. The umbrella flight was carried out with the help of two (in another version, three) turbojet engines installed at the bottom of the vehicle. In horizontal flight, the blades were set to zero angle, directional control was carried out by differentiating the thrust of the turbojet engine or by deflecting them

exhaust co-

sang. The designers came to the final layout only after unsuccessful tests of 15 previous options. The prototype of the latest version of the device took off on February 14 (according to some sources - January 14), 1945 near Prague.

The most mysterious were the devices developed according to the projects of Naipevi and UGSh, legends arose among ufologists about the use of electromagnetic and antigravity engines as power plants for these devices, information about which the Germans allegedly received from extraterrestrial civilizations. However, everything was much more prosaic — the vehicles of the Nasleri and UPI projects were vertical take-off and landing vehicles with an engine (turbojet or theater) located inside the body of the vehicle, creating a directional
down stream. gases.

This program was transferred to Breslau from Peenemünde. The project was headed by design engineer Richard Mite, one of the developers of the V-2. There is very little biographical information about Mita, but it is known that he was a close friend of von Braun. In Breslau, Mite set up a new design team, and in the summer of 1944, the SS leadership transferred Mite to Prague, so that he, together with Schriver, began to develop a new aircraft.

The Nanpeji apparatus was shaped like a hat with a high top. The crown was the inlet of the air intake, and the cockpit was also located there. In one version, a turboprop engine was located vertically under the inlet, turning one multi-blade rotor or two coaxial rotors (in one of the models of this option,

engine

VMU 028). In a different. In the variant, instead of a TVD, there was a starting motor for the initial spin-up of the rotor, and its main rotation was carried out using a ramjet engine installed on it, while fuel was supplied to the engines due to centrifugal forces. Variants with a vertically located turbojet engine were also developed and studied.

The exit of air or its mixture with combustion products from the body of the apparatus was carried out in various ways. As a rule, in small vehicles, the jet flowed out through a nozzle located on the axis of the apparatus, and thus created a lifting force. Horizontal flight was carried out due to the deviation of the outlet section of the nozzle from the axis in one direction or another. For large-sized vehicles, the exhaust nozzle, which created the lifting force, was annular. It was formed by a profiled gap between the body of the apparat and the bottom in the form of a central disk with edges bent downwards. To carry out horizontal flight from the bottom on the bottom, sustainer turbojet engines were installed. The directional control was carried out either by differentiating the thrust of the sustainer turbojet engines, or by deflecting the engine nozzles. Of the developed projects of the Naipefi series, the Naipebi-Sh had the largest dimensions, the diameter of which reached 71 m.

mm.

At the end of 1944, a group of designers led by V. Schumann worked on the designs of Up-Tareg disk devices (the first flight of a prototype, presumably, took place on February 19, 1945) and UtSh-2? armed with one 80 mm cannon, two MK 108 cannons and two. MC 17 machine guns.

Viktor Schauberger, studying the nature of vortex fluid flows, came to the conclusion that it is possible to create a fundamentally new type of engine. In 1940, he created the first sample of his engine, which received the designation Kershisip-A, and soon the basic design of the engine was transferred to Heinkel by order of the KM. In 1941, Schauberger was connected to work on the system

aircraft engine cooling at Messerschmitt. !

However, he did not stop working with his Kerip-A engine. The main idea used in this engine was to combine the compressor and turbine wheel into a single unit.

The engine model had a diameter of 1.5 m and weighed more than 130 kg. In the engine housing there was a rotor with helical blades, and an electric starter was fixed above the housing. The starter motor drove the rotor, which formed a mini-tornado. In this case, the liquid, being thrown to the periphery due to non-introductory force, passed through the "corkscrews" of the rotor and began to rotate along the axis of each of the blades. Schauberger believed that under certain conditions the vortex became self-sustaining, like a natural tornado. To do this, it is necessary to bring heat to the vortex, which would be absorbed by it and maintain its rotation. This function was performed by a heat exchanger. When the engine reached a self-sufficient mode, the starter turned off, - water was supplied to the engine through pipelines under a certain pressure. The mini-tornadoes formed by the rotor went around the inner surface of the upper part of the engine, fell into the inner cone and were ejected through the nozzle. The first test of the engine turned out to be unsuccessful: the engine took off, breaking through the roof of the laboratory, and completely collapsed. 5

According to some reports, after this incident, Schauberger was imprisoned in a concentration camp in Mauthausen. Here, on the instructions of the SS, he is working on the creation of a miniature low-noise submarine for sabotage purposes, the so-called “bio-submarine”, a group of specialists from among the prisoners, numbering about 30 people, was assigned to help him. The submarine was to be called EotePe (“Trout”), as it moved in the water around it, using the engine, a vortex current was created to reduce resistance. In 1944, Schauberger was returned to Vienna, then the SS connected him to the Schriever disk program. At the end of the war, representatives of the American secret services were the first to break into Schauberger's laboratory, despite the fact that it was in the Soviet zone of occupation. After a brief interrogation, they released

specialist

recruited from the prisoners of the concentration camp, and Schauberger himself, along with all the documentation, was taken to the American zone and imprisoned for six months in a filtration camp in order to ascertain the degree of his awareness. The Soviet secret services, arriving later than the Americans, found only scattered sheets with suspicious drawings and figures. .

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The class of unmanned vehicles included "Belluzzo disks", these were disk vehicles with jet engines at the edges. They were intended for two purposes: delivering strikes against distant targets: ground targets (analogous to long-range artillery) and combating Allied bombers (analogous to anti-aircraft artillery). In both cases, a compartment with a warhead, equipment, and a fuel tank were located in the center of the disk; ramjet engines were used as engines.

The disc was launched from a ground launcher as follows. The disk was spun around its axis with the help of a special starting device or with the help of resettable starting accelerators, after reaching a certain number of revolutions, the main ramjet was switched on. The resulting lift force was generated both by the downward thrust of the engines and by the additional lift force that arose when the engines sucked the boundary layer from the upper surface of the disk. The jet jets of the engines of the disk rotating in flight created the illusion of fires rapidly running along the edge of the disk and flashing. In flight, fuel was supplied to the engines from the fuel tank due to the action of centrifugal forces. In the first variant of combat use, after running out of fuel, the disk fell to the ground and exploded, that is, it was an analogue of long-range artillery. In the second variant, the disc exploded when approaching the formation of bombers, that is, the disc worked like an air mine. According to D. Belluzzo, the author of these developments, the Germans intended by 1950 to create a similar lisk with a diameter of 10 m, capable of carrying an atomic bomb.

One of the varieties of disks, designed to fight the armada of allied bombers, had blades along the edges and resembled a disk cutter. The purpose of this lisk was to crash into the combat formation of the bombers and, rotating, shred everything that came across the path. At the same time, in the event that the disk itself lost at least one blade (this is more than likely in the event of a collision of two devices), the center of gravity of the disk shifted relative to the axis of rotation, and the device began to throw in the most unexpected direction, which caused panic in the combat formation. aircraft,

Some versions of the disks were equipped with a system for creating electromagnetic interference for radar and navigation equipment of bombers. Apparently, such discs were created using the Yecegra program! {"Fire ball"). In the autumn of 1944, a number of studies of electric apparatuses were completed at the experimental test center of the Luftwaffe OBE (Oberammergau, Bavaria). capable of affecting the operation of aircraft ignition systems

engines at a maximum distance of up to 20–30 m by creating powerful electromagnetic fields. At the same time, the Germans were developing devices capable of interfering with navigation devices and radars of allied aircraft. The radio-controlled vehicle was brought to the allied bombers by a ground operator, after which the vehicle automatically focused on the exhaust from the engines and approached close enough to the aircraft to interfere with their radars. EzegfaP was first created at the aircraft factory in Wiener Neustadt (south of Vienna) with the help of the aviation electronics firm EEO. Goering, interested in advancing the development of "wonder weapons", hoped that the Herzegba principle could also be used to produce offensive weapons capable of revolutionizing the airfields of war. As the Soviet troops advanced into Austria, the Eeeegray production was transferred from Wiener Neustadt to the Terrain Megke underground facility in the Black Forest (this is the same area where the crews of the 415th Night Fighter Squadron of the 9th Air Force of the US Air Force sometimes encountered unidentified flying objects). In addition to Herzeg-Baj, one of the enterprises of the huge underground complex in Thuringia developed and tested unmanned vehicles Kyre r ("Ball Lightning"). The fate of the developers of disk devices with the end of the war was different. Mitya is believed to have left Czechoslovakia for the west in early May, seeking contact with people from American technical intelligence. Finally, on the recommendation of his old friend,

jet drive

von Braun ended up in Wrightfield, a leading US Air Force research center, a fact recently confirmed by former US Air Force Deputy Commander Alexander Flaks. At first, Mite worked at the White Sands missile center (the projects in which he took part are still classified), and then he was sent by the Americans to Canada to the Avro company, in which in the 50s. at least 16 disc projects were developed. By 1955, Mite had completed the construction of a discoplane, the prototype of which was tested back in 1944 in Germany. The first flight tests of the discoplane took place at the Avro company in Malton (Canada), subsequent tests were carried out in the USA at the Edwards air base.

Habermol is believed to have been captured by Soviet troops at the Letov aircraft factory near Prague, his further fate is unknown. About the post-war fate of Belluzzo is also practically nothing is known.

Shriver ended up in the American zone of occupation. After long and thorough interrogations in the special services, he was released, after which he got a job as a courier for the American army newspaper The Stars and Stripes Banner. There he worked as a chauffeur and delivered newspapers to American bases in Germany. There is speculation that Shriver may have played the role of liaison in

underground network of the SS, which organized the removal from Germany of people suspected of committing war crimes. He died in the late 50s. in Bremenhaven. No written records of his activities during the war period remain, except for a few controversial newspaper interviews. In one of them, in particular, he stated that the "flying saucers" in the photographs of the 50s vols. very reminiscent of the developments that he and R. Mite were engaged in during the war.

After the end of the war with In Japan, the Americans released V. Schauberger to freedom, forbidding him to engage in “flying discs” in the future. He has worked on various civilian vortex technology projects, including generators, water purification and air purification. Having learned about the work of the Avro-Canada company in the field of creating disk devices, he turned to the company with offers of cooperation, but was refused.

In 1957, V. Schauberger and his son Walter were offered to move to the USA and work on recreating his engines. They agreed, after which they began their work at a secret military base in Texas, and they were forbidden contact with the outside world. When the contract was coming to an end, Viktor Schauberger categorically refused the offer to extend the contract. Leaving the USA, the father and son gave a non-disclosure agreement, and the Americans reserved all rights to the results of the work. Five days after returning home to Austria on September 25, 1958, Viktor Schauberger died. According to Walter, before his death, his father kept repeating: “They took everything from me. I don't belong to myself anymore."

The analysis shows that the maximum speeds (from 2,000 to 7,000 km/h) attributed to disk vehicles of the Second World War by some aviation historians (mainly German) are in fact several times overestimated. The level of development of German engine building at that time was such that the dream of one of the pioneers in the development of supersonic aircraft, Professor A. Linpisch, was to achieve a maximum speed of 2,000 km/h. Higher speeds (up to 3500 km/h) were achieved only by the V-2 rockets developed by von Braun, with which the Germans fired at the cities of England, France, Belgium and Holland. But we must keep in mind that such a high flight speed was achieved within a very short period of time - the flight time of the rocket was only about five minutes. The operating time of the powerful liquid-propellant rocket engine, with which the rocket was equipped, did not at all exceed 60-70 s. Attempts by German scientists and designers to create devices capable of flying for a long time at a speed many times higher than the sound speed ended by the end of the war only with the development of the concept of a hypersonic bomber by E. Senger. Until the end of the war, this fantastic concept at that time was never realized.

It is known that after the end of the war, disk aircraft were developed by the aviation companies of the victorious countries. First of all, these devices were of interest to the military. The disc has excellent rigidity characteristics, good stability

with vertical climb, low aerodynamic resistance, large internal volume to accommodate equipment, fuel and payload. However, the main advantage of the disk is its minimal effective reflection surface when it is irradiated by a radar. This circumstance is very important when creating "invisible" aircraft. In addition, such aircraft could do without runways, which, as the experience of the end of the war showed, are very vulnerable in conditions of massive bombing and rocket and artillery shelling. That's why. all work on disk devices were classified.

15. BALLISTIC AND CRUISE MISSILES

A4

In the early 30s. Colonel Carl Becker, Head of the Ballistics and Ammunition Division of the Army Armaments Directorate at the German War Ministry, led the long-range missile program. The direct person responsible for the implementation of the program was Colonel Walter Dornberger. At the Kummersdorf artillery range, located a few tens of kilometers from Berlin, the construction of an army testing center for liquid rockets began. To work in the test center, the Heilandt company, which developed the liquid-propellant rocket engine, was transferred to its main employees — chief engineer Pitsch, V. Riedel, G. Grunov, A. Rudolf, K. Wamke, and others. In October 1932, a young employee, Wernher von Braun, was hired to the center's staff. By that time, he had completed an accelerated course of study at the ETH in Zurich.

Immediately after Hitler came to power, von Braun joined the SS. In 1934, he completed his dissertation, and the defense took place without discussion, since the topic was closed. K. Becker, a friend of the von Braun family, authorized the allocation of a laboratory in Kummersdorf and a patent for all rocket developments to the young scientist. Work began on rockets of the A series (from the German word Avrgeva!). W

Rocket A1 had a length of 1.4 m and a diameter of 0.304 m, equipped with two tanks with 40 kg of liquid oxygen and alcohol. This amount of fuel and oxidizer was enough to

so that the engine can develop a thrust of 300 kgf for 16 s. During the testing of the rocket, many problems arose, in particular, the reliability of the combustion chamber made of aluminum alloys was low due to burning it in different places. There were problems with the stabilization of the rocket in flight, since when it rotated around the longitudinal axis, the fuel supply was difficult due to the occurrence of centrifugal forces. Launches of a modified version of the rocket weighing 150 kg were carried out with a vertical guide length of several meters, during the tests there were many failures. The A2 rocket, which was similar in design to its predecessor, received a stabilizing girdoscope installed in the middle between the fuel tanks and

- “oxidant. At the beginning of December 1934, two successful launches were made from the island of Borkum, during which it was possible to reach an altitude of 2200 m. In parallel, work was carried out to create a large engine with 1000 kg of thrust and an operating time of 45 s.

A year later, General Fritsch, Commander of the Land Forces, visited the laboratory. The shown developments made an impression on him, and he got the Fuhrer to allocate 20 million marks for new experiments. Purchased in 1935: for 750,000 marks, a territory near the small fishing village of Peenemünde on the island of Usedom in the Baltic Sea. First, a settlement appeared for workers and their families, then the first laboratories, workshops, testing grounds, etc. The village of Peenemünde was not marked on any map. The operation of the center, which received the name NUR (Heeres Wer zasnapzan Reepetipde), was carried out jointly by the army and the Luftwaffe. Soon, a power plant, a large plant for the production of liquid oxygen, a rocket assembly plant, a materials research institute, a supersonic wind tunnel, a test airfield, missile launchers, etc. were built on the territory of the center. - the center's staff of up to 30 thousand people, expand the production of missiles, establish a direct railway and. air connection with Berlin. The entire territory of the center was divided into twǫ zones: the western one, in which the Luftwaffe conducted its research, and the eastern one, which was the area of responsibility of the Wehrmacht. SAME

Attempts to launch large rockets in Kummersdorf were stopped until the beginning of 1937. Meanwhile, an AZ rocket 7.65 m long and 0.76 m in diameter was being designed in Kummersdorf. Wernher von Braun. entered into an agreement with the firm Kyggizeiregaie Sthn (Berlin-Britz) for the manufacture of a control system. At the beginning of December 1937, the first launch of the AZ took place at the new training ground Otey5ua! det-

Oiev in Peenemünde. The studies eventually showed that the control system is too weak and insufficient to stabilize the rocket.

In 1936, the Ordnance Department provided funds to the Missile Center on the condition that development of a long-range missile be started immediately. Dornberger's headquarters launched a program to develop a new A4 rocket that could deliver a 1 ton payload over a distance of 250 km. Calculations showed that such a rocket requires an engine that develops a thrust of 25 te. Work on the new engine began in Kummersdorf in autumn 1936 under the direction of Dr. Walter Thiel. Bench tests of the engine began in the spring of 1939 in Peenemünde.

In March 1939, Hitler came to Peenemünde to get acquainted with the process of developing the A4 rocket. He was dissatisfied with the state of affairs, and, as a result, appropriations for the missile program were cut in half. Then Hitler still hoped to quickly capture England by landing as part of the planned Operation Sea Lion. In parallel with the work on the A4, work was carried out on the A5 rocket. The final version of the A5 rocket weighed only 900 kg and reached a height of 12,000 m with a vertical launch; with an inclined launch, the range was approximately 18 km. During the period from 1939 to 1942, several hundred A5 rockets were tested in Nenemünde.

Tests of prototypes of the A4 rocket began in the spring of 1942, the first launch took place in October of the same year. Until the summer of next year, about 30 rocket launches were carried out, while a range of about 200 km was reached. In July 1943, Hitler ordered the start of serial production of the A4. ki

In the nose of the rocket there was a warhead weighing 910 kg with a contact fuse, behind it was

compartment with control system. Tanks with fuel components (liquid oxygen and alcohol) were placed in the middle part of the hull. The rocket engine, which developed a thrust of 25 tf, and a turbopump unit for supplying fuel components to the engine combustion chamber were located in the tail section. The tail unit consisted of four stabilizers with aerodynamic rudders. To control the rocket at the launch site of the trajectory, ` graphite were used. gas rudders installed behind the jet nozzle of the engine. The missile control was programmable, with radio adjustment from the ground control station, stabilization was carried out with the help of gyroscopes. Missile launches were initially carried out from stationary positions, but later mobile launchers were developed, including the so-called MeShegmawep. 6 - `By September 1944, about 12 thousand A4 rockets were built. The labor costs for the construction of each rocket were 12,950 man-hours, and it cost 38,000 Reichsmarks. The first combat use took place on September 8, 1944 — in the morning the first A4 rocket was fired at Paris, and in the evening launches at London began. From then until March 27, 1945, launches occurred almost continuously. In total, approximately 5,500 rockets were launched, of which about 2,000 were launched in London and about 1,600 in Antwerp. Characteristics of A4: length - 14.04 m; plumage span - 3.56 m; maximum hull diameter - 1.65 m; starting weight - 12,900 kt; warhead weight - 910 kg; range - 280-320 km. I

A9/A10

Even at the beginning of the wars in Peenemünde, work began on the possibility of delivering missile strikes against the United States. However, the A4 rocket, due to its limited range, was not suitable for this purpose. Therefore, in order to increase the flight range, it was proposed to create a cruise missile with a longer range on the basis of the A4 missile. But the estimated range of the cruise missile modification, which received the designation A40, was 500-600 km, which was also not enough to reach the United States. Therefore, in 1943 there was

a technique for launching rockets from floating launch containers has been worked out.

Such a container with a missile placed in it was supposed to be delivered to a given area in tow behind a submarine. During towing, the container was in a submerged position, and before launching the rocket, it was transferred to a vertical position (like a float) by pumping ballast water. It was assumed that the XXI class submarine would be able to simultaneously tow three containers with missiles. However, with the strengthening of air defense and the US Navy, the German command had to abandon such an idea, nevertheless, before the end of the war, one launch container was built at the shipyard in Elblag.

Then von Braun's designers began to develop a two-stage rocket under the designation A9/A10, which was supposed to be launched from Europe. The first stage was the A10 launch vehicle, 20 m high, 4.1 m in diameter, and with a launch weight of 69 tons. The original A10 LPRE had 6 combustion chambers, similar to those of the A4 rocket, working for one jet nozzle. Then this option was replaced by another one with one large combustion chamber,

The A9 cruise missile was envisaged as the second stage. Its length was 14.2 m, diameter 1.7 m, total weight 16.3 tons. It was supposed to place about a ton of explosive in the bow. In the middle part, it was originally envisaged to install a swept wing; later, based on the results of blowing in wind tunnels, it was replaced by a delta wing. At that time, only a pilot could provide the necessary guidance accuracy with a flight range of about 5,000 km, so the A9 was manned. Behind the compartment with the warhead in the nose of the rocket, it was planned to install a sealed cockpit. To achieve the estimated range, the maximum height of the flight trajectory exceeded 80 km, that is, the rocket had to go into outer space. At the same time, the pilot who controls the rocket could formally be considered an astronaut. It is necessary to remind the reader that after almost twenty years for such suborbital flights on the Mercury spacecraft

(without going into orbit), the Americans Sheppard and Grissom received the title of astronauts. The script for the flight of the A9 / A10 rocket should have looked like this. After the launch of the rocket and the separation of the first stage A10, the second stage A9 with the LRE in operation continued its flight with an increase in altitude and speed. After running out of fuel, the rocket switched to the gliding mode, and the pilot took control. He had to carry out further flight using radio signals from submarines for navigation. Having brought the car to the target and stabilized its trajectory, the pilot had to eject. Theoretically, it was assumed that the pilot who descended on the parangote would be picked up by German submarines or he would be captured by the Americans. Experts, on the other hand, estimated the real chances of a pilot to land or splash down alive as 1:100. The first flight of the A9/A10 system was planned for 1946. +

In 1943, the development of the A9 / A10 project was in full swing, but the events that took place soon forced the German leadership to change plans. The fact is that back in 1942, Allied intelligence became interested in top-secret German facilities in the Peenemünde area. An operation was devised, the purpose of which was a massive bombardment of the power plant, the plant for the production of liquid oxygen, assembly buildings, etc. In order to lull the Germans' vigilance, Allied reconnaissance aircraft, for several months before the scheduled operation, made regular flights along the coast from Kiel to Rostock. The German air defense systems were categorically ordered not to open fire on reconnaissance aircraft and not to raise fighter-interceptors in order to avoid unmasking the objects in Peenemünde. And then, late in the evening of August 17, 1943, the allied armada, consisting of almost 600 long-range bombers, took off on a mission. The Germans took this operation as an intention to bomb Berlin, for this reason, Berlin's air defense was put on full alert. However, unexpectedly for the Germans, the allied armada over the island of Rügen changed course: instead of turning south towards Berlin, the bombers turned southeast. That night, more than 1,500 tons of high-explosive and incendiary

bombs, the regional center suffered enormous damage. During the bombing, more than 700 people were killed, among whom were many specialists, including the chief designer of engines for A4 rockets and V!azze a! Dr. Thiel and chief engineer Walter.

Immediately after the raid on Peenemünde, measures were taken to accelerate the construction of the huge underground Mittelwerk plant in the limestone mountains of the Harz near Nordhausen. This plant was intended for mass production of aircraft turbojet engines and U! and U2. For work at this plant, the Germans used 30,000 prisoners placed in the Dora concentration camp specially built for this purpose. A test site for missiles was urgently equipped in Poland. Only the design office and testing laboratories remained in Peenemünde. Under these conditions, it was ordered to freeze work on the A9/A10, and to concentrate all efforts on the serial production of the A4 ballistic missile.

In June 1944, on the orders of Hitler, work was resumed under the code name Proek Atepka. To speed up the work, we decided to take the A4 cruise missile as a basis, and to develop it in unmanned and manned versions. It was supposed to install an aircraft landing gear on the A4b manned cruise missile, as well as an additional turbojet or ramjet engine in the lower stabilizer, the pilot was located in a pressurized cabin in the nose of the rocket.

By the end of 1944, the Germans managed to build only prototypes of the unmanned version of the A4r rocket. Tests of the first prototype took place on December 27, 1944. The launch ended in an accident due to a failed missile control system at an altitude of about 500 m. Only the third launch of an unmanned rocket, which really took place on January 24, 1945, was successfully completed. The rocket reached a speed of 1200 m/s and an altitude of 80 km, but after switching to the glide mode, the wing of the NGE broke, and the rocket fell into the sea.

The Germans failed to implement the planned projects of the A40 and A9 manned cruise missiles before the end of the war, all the work remained at the stage of sketch drawings. As for the training of pilots for rocket flights -

indeed, as part of the 5th. squadron of the 200th bomber squadron, since 1943, a group of suicide pilots was trained to fly projectiles and cruise missiles. However, not a single case of combat use of German aircraft with suicide pilots was recorded until the end of the war.

On May 5, 1945, the Peenemünde test center was captured by Soviet troops, but all the scientific and technical personnel of the Rocket Center managed to evacuate to Bavaria in April. Wernher von Braun took refuge in an Alpine ski resort, where, after the German surrender was announced, he surrendered to the Americans. He, like thousands of other major Nazi scientists and engineers, was transported to the United States as part of the secret operation Skrenk. He is there. continued to work on the Pentagon's missile issues, being under the close supervision of the special services. In 1951, under the leadership of von Braun, the Redstone and Atlas ballistic missiles were developed, which could carry nuclear charges.

Eugene

In 1942, Rheinmetall-Borsig began the development of an unguided four-stage surface-to-surface rocket Eheilhote (“Courier of the Rhine”). In the tail section of each stage, equipped with a solid-propellant engine, there were stabilizers, the span of which decreased from the first to the last stage. The length of the rocket was 11.4 m, it weighed 1715 kg at launch.

During launch, the first-stage engine created a thrust of 9800 kgf, which was only enough for the rocket to break away from the launcher. A second later, the engine of the second stage was turned on and within 5 seconds it created a thrust of 5600 kg, and the engine of the third stage had the same characteristics. The engine of the fourth stage created a thrust of 2400 kgf for 3.5 s, the final range of the rocket was 215 km. The warhead weighed only 44 kg, of which 20 kg were explosives. The rocket was launched from the launcher at an angle of 45-65 to the horizon. Transportation of the rocket Engingoge from the warehouses to the starting positions was carried out with the help of

MeShegkarep vehicle, which was used for the A4 rocket. Rocket tests began in the fall of 1944, and at the end of that year, a specially created unit fired about 220 rockets at Antwerp.

ÿÿ 103% b

In 1935, Paul Schmidt, together with Professor G. Madelung, proposed a project for a glide bomb equipped with a pulse jet engine. The Luftwaffe, however, rejected the project as "technically dubious and uninteresting from a tactical point of view." Soon, work began on a remote-controlled unmanned aircraft at Argus Motoren in Berlin under the direction of Dr. Fritz Gosslau. This target aircraft, which was intended for training of anti-aircraft teams of the Luftwaffe, received the KEM designation G2b 43. .

In 1940, the Luftwaffe connected Schmidt to the work of the Argus company. Schmidt proposed a simple but effective inlet device that allowed air to enter the combustion chamber of the engine, but automatically closed when the fuel mixture exploded, directing the combustion products into the jet soll. Argus, on the other hand, has developed a new method of fuel atomization in the combustion chamber, which

ry solved the problem of stable combustion when fuel was supplied at a frequency of 60-70 Hz. The completed project of the Argus-Schmidt engine was simpler and cheaper compared to competing turbojet engines and had a greater thrust-to-weight ratio. On the other hand, the engine had significant drawbacks - low fuel efficiency and increased engine vibration during its operation, which caused damage to the hull.

The Argus began testing the new pulsating engine in automobiles in January 1941, and already on April 30 the first flight of a So 145 biplane aircraft equipped with an experimental scramjet took place. Gosslau suggested to the Luftwaffe that the PUVRD be used as the power plant for a glide bomb, but the Argus lacked experienced designers capable of designing a bomb body. Therefore, Gosslau turned to Fieseler with a proposal to jointly develop a planning bomb with NuVRD. In Fieseler, the project was headed by Robert Lusser, who at the end of April 1942 proposed the layout of an aircraft with one engine,

updated above the tail.

He intended to install on the apparatus, which became the first cruise missile, a radar and a radio command control system, but these proposals were rejected due to fear that the Allies would use electronic countermeasures. Instead, we turned to a variant with an inertial control system. The proposed vehicle was designated P.35 Etiti by Fieseler, it had a range of 300 km and could carry a 500-kg warhead at a speed of 700 km/h. The project, presented to the leadership of the Luftwaffe on June 5, 1942, was received with enthusiasm, as the attitude of the Luftwaffe high command towards this type of weapon changed dramatically. The fact is that after the allies began systematic bombing of German territory, Hitler demanded that punitive strikes be carried out against England.

However, at this time the Luftwaffe was short of heavy bombers due to delays in the development program for the He 177. Therefore, in order to increase its prestige, the Luftwaffe:

development of its A4 ballistic missiles and blamed the Luftwaffe for the failures in 1940 during the Battle of England.

The winged raksta project was approved on June 19, 1942 and included in the Vulcan program, which combined the efforts of the Luftwaffe in the field of missile development. The device, which had the internal designation P.35 in the Fieseler company, was officially named P103 in KEM. In order to ensure secrecy, the project first received the code name Kÿrÿsÿkerp (“Cherry Stone”), and then E7ÿ 76 (Nakgereta 76). Argus was responsible for the pulsating engine, now designated AS 014. The development of the guidance system was entrusted to AS Kalia (Berlin), which had already built inertial guidance systems for other Luftwaffe missiles. The firm Kuipteÿa1-Vogsÿv developed the launcher.

The first sample of the Yei 103 rocket was completed by August 30, 1942, the engine was ready in September, after which flight tests began. Numerous failures during flight tests almost led to the termination of the program. After the problems with the development of the engine were resolved, a position was prepared for testing at the Luftwaffe "Penemünde-West" training ground, it was located next to the starting position for launching A4 ballistic missiles. The launching position with the catapult of the company Khenipteiaii-Vogvir was established in an easterly direction along the Baltic coast. The first launch of a mock-up sample from a catapult took place on October 20, 1942, and the first launch of a prototype Eÿ 103 U12 with the engine turned on took place on December 24. The rocket flew for about a minute and reached a speed of 500 km / h before falling into the Baltic Sea. In parallel, the method of launching a rocket from a carrier aircraft was being worked out. The first launch of a rocket without an engine from an Yem 200 aircraft took place on October 28, and on December 10, an E 103 U7 was launched with the engine turned on.

The implementation of the test program was accompanied by numerous failures and accidents. The shortcomings of the Rheinmetall-Borsig launcher led to the appearance of an alternative catapult Bs Igtoites Schetz-Chet, developed at the beginning of 1943 by the Walther company (Neit Maket Megke). In the design of the catapult Val

Tera used a gas generator that operated on a combination of T-Ou (hydrogen peroxide) and 7-u (sodium permanganate). The high-pressure gas resulting from mixing the components was pumped into a cylinder inside the guide rail of the catapult and set in motion a piston attached to the rocket, which accelerated it. 9

The operation of the engine was accompanied by strong noise and vibration of the fuselage and wing panels. The most painful problem was the destruction of the inlet flaps of the air intake. By the end of July 1943, 84 Yei 103 rockets were launched, of which 16 rockets were launched in the air from a carrier aircraft and 68 rockets from ground-based catapults. Of all catapult launches, only 28 launches were successful.

The rocket was a cantilever mid-wing with a fuselage about 6.5 m long and a maximum diameter of 0.8 m. The first modifications of the rocket were made entirely of steel, but then the wing began to be made of wood. Various wing shapes of different spans were tested - trapezoidal, rectangular, "butterfly" type. A PUVRD Av 014 was mounted above the rear fuselage. A warhead weighing 850 kg with fuses was installed in the front part of the fuselage;

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the role of altitude and flight range, in the tail section - rudder drives. The take-off speed of the rocket from the ground launcher was 280–320 km/h, the flight speed was from 565 to 645 km/h (for different modifications), the flight altitude was usually about 600 m. The autopilot operated as follows. A pair of gyroscopes controlled roll and pitch controls, while a barometric device controlled flight altitude. A small propeller on the nose of the rocket was connected to a counter that measured the distance traveled by the rocket. As soon as the distance counter determined that the specified range had been reached, two squibs locked the control surfaces in such a position that the missile began to dive to

target. -

In April 1943, Colonel Max Wachtel was appointed commander of an experimental cruise missile unit | eng

oops EgrgoBudevkopipapdo Mace. This team was deployed at the Peenemünde training ground, and later became the basis for the creation of the EK 155UU anti-aircraft regiment, where "MM" meant "Megger" ("launcher").

By order of Hitler on May 26, 1943, a special commission was set up to decide whether it would be preferable to use the Luftwaffe E2C 76 cruise missile or the A4 army ballistic missile as a weapon for the bombing of England. The mission concluded that both missiles should be put into service because they complemented each other. The ELS 76 cruise missile was estimated to be more vulnerable to interception, but much cheaper to manufacture and much easier to maintain. The A4 ballistic missile was immune to interception, but very expensive to manufacture and difficult to maintain.

There was no agreement among senior leadership on how best to deploy the new missiles. The commander of the anti-aircraft artillery of the Luftwaffe, Lieutenant General Walther von Axthelm, wanted to deploy in large numbers small positions that could be easily camouflaged. However, Field Marshal Erhard Milch was more inclined towards building a small number of powerful bombproof bunkers. In this regard, on June 18, 1943, Goering held a meeting with Milch and Axthelm, at which he proposed a compromise solution: build 4 large missile bunkers and 96 small positions. In addition, it was supposed to launch E2O 76 from bombers. Rocket production was to begin in August at a rate of 100 rockets a month, then gradually increased to 5,000 a month by May 1944. Hitler approved this plan on June 28, 1943, setting the Kitscheker program in motion.

It was supposed to start mass production in August {943, so that by the start of combat use, scheduled for December 15, 1943, 5,000 missiles would be ready. However, the production of the Ei 103 started a month later at the Volkswagen plant in Fallersleben and the Fieseler plant in Kassel. On October 22, British bombers raided the Fieseler factory, damaging the assembly lines of ÿÿ 103. To this was added the flow

changes and modifications in the project, after which, at the end of November, production was suspended until the problems were fixed. Production did not start again until March 1944, but the assembly lines were damaged shortly thereafter by Allied bombing of the plant in Fallersleben. Therefore, in July, the production of E! 103 was started at the Miemetgke underground factory near Nordhausen, as it was more protected from bombing.

Unlike conventional aircraft, the E! 103 was not completely assembled in factories. Instead, the main components of the rocket (fuselage, engine, wing, warhead and other subsystems) were supplied to the Luftwaffe ammunition depots. Four warehouses were assigned to the EEC 76 program, the most important of which were located in Mecklenberg and Dannenberg. In these warehouses, the complete assembly of the rocket was carried out, after which it was installed on a technological trolley.

TUU-76. In this form, the rockets were delivered to field depots in France. Sensitive equipment such as an autopilot and a compass was already installed there, and rockets were delivered from field warehouses to launch positions.

When the Ej 103 finally reached mass production in March 1944, the production time for one rocket was reduced to 350 hours, of which 120 hours were spent by a complex autopilot. The cost of one copy of the rocket was about 5060 marks, which was only 4% of the cost of a U2 ballistic missile and approximately 2% of the cost of a twin-engine bomber.

The construction of launch positions in France began in August 1943. In the initial phase, 96 positions were built along the English Channel from Dieppe to Calais. Each position included a launch platform, a non-magnetic pre-launch magnetic compass adjustment room, a control bunker, three missile storage depots, and several smaller buildings for fuel and spares storage. purpose of camouflage positions. The missile positions were usually located alongside existing roads, which were either repaved or resurfaced to facilitate the use of multiple vehicles,

serving the launch site. Often the positions were located near farms or residential buildings, which were used to place launch crews, and also helped to mask the position.

-At the end of October 1943, the newly formed regiment EK155U/ under the command of Colonel Wachtel was transferred to France. It consisted of four battalions, each with three batteries and service and supply units. The battery had three platoons, each with two launchers, for a total of 18 launchers per battalion and 72 launchers for the entire regiment. Each launcher was manned by up to about 50 men, and the regiment as a whole had approximately 6,500 personnel. Due to the technical complexity of the new weapons, several dozen civilian specialists were attached to the EB!554 / regiment.

In order to coordinate the bombing of London with B103 and A4 missiles, on December 1, the Wehrmacht created a hybrid unit, the IXU Special Army Corps, staffed by army and Luftwaffe officers. Lieutenant-General Erich Heinemann, former head of the artillery school, was in command of the XU Corps; Colonel Eugen Walter of the Luftwaffe was appointed chief of staff. After inspecting the positions, the corps headquarters was alarmed by the lack of planning and the unrealistic expectations of the high command. The high command insisted that rocket attacks on London begin in January 1944, ignoring the fact that the positions were not fully prepared, the training of personnel was not completed and the delivery of missiles had not yet begun.

On April 30, 1944, Hitler ordered the abolition of the names E76 76 and Kigsekegp in favor of Maikageg ("Maybeetle"). The combat launch of the first ten missiles against targets in England took place at dawn on June 13, 1944, the launch was carried out from ground launchers. By June 29, the number of rockets launched from catapults had reached 2,000, and the first combat launch of a rocket from an aircraft carrier Hesh took place on July 7. German propaganda during radio broadcasts on June 23, 1944, launched the use of the term UI (Uegvenipezhaiie - "weapon of retaliation"). At the direction of Hitler, this name was made official from July 4, 1944. On

rank M| lasted until November 2, 1944, when Hitler ordered the missile to be renamed Kgava ("Crow").

The experience of combat use U! revealed the low efficiency of this weapon, as evidenced by the following data. Until the end of the war, 10,492 rockets were fired at targets in England, of which 3,004 exploded at the start, 232 were destroyed when they collided with the obstacles, 1,878 were shot down by anti-aircraft artillery, and 1,847 were destroyed by air defense fighters. That is, about 30% of the missiles were lost due to design and technological flaws, and almost 38% due to the fact that the autopilot-controlled missile in cruise mode was a non-maneuverable pellet that could not even evade a collision with an azostat obstacle . Some British fighter pilots even managed to turn over a flying rocket by prying its wingtip with the plane of their plane, after which the rocket, losing stability, went into a tailspin and fell to the ground.

In August 1944, Gotha offered two modifications of the E! 103 designed to attack enemy ships, dams, bridges, moorings, coastal fortifications, etc. e. In the first variant, a hull similar to the hull of a speedboat was attached to the ÿÿ 103 from below; Another option was to place the Uÿ missile on submarines and launch it from watertight containers installed on the deck. However, these proposals have not received official support.

Characteristics E! 103: wingspan - 5.33 m; fuselage length - 6.65 m; rocket length - 7.73 m; the maximum fuselage diameter is 0.825 m; takeoff weight - 2160 kg; warhead weight 850 kg; speed - 645 km / h range - 260 km.

vk-pv

The Rheinmetall-Borsig branch in Düsseldorf developed in May 1940 a project for the EK-KV glide bomb, which was the prototype of a cruise missile. The warhead was a standard

250-kg bomb, a piston engine weighing 399 kg and 325 hp was used as a power plant. With. The engine drove a pusher propeller located in the tail ring. Estimated fuel consumption was 51 kg at a distance of 500 km.

The greater weight of the power plant was the reason for the development of the second version of the rocket, equipped with a ramjet engine. Inside the tail ring there was an annular combustion chamber, which weighed only 85 kg, however, at a distance of 500 km, such a power plant consumed 152 kg of fuel. The rocket had a length of 4.15 m, the diameter of the tail ring was 1.6 m. At the same time, the EK-KV was supposed to enter the horizontal section of the flight path at a speed of 792 km/h, the estimated time for passing the route 500 km long was approximately 38 minutes. The bomb was to be controlled by radio.

7 Miv Kozyrevy

16. Anti-aircraft missiles

Mazzepie e

In the middle of World War II, Allied aviation began massive raids on German territory. The fighters and anti-aircraft artillery, which were in service with the Luftwaffe, could no longer cope with the armadas of allied bombers. In this regard, the German top leadership demanded from the military industry the development of new, more effective anti-aircraft defense methods. This is how the idea of development of the Uazvepai (Waterfall) guided anti-aircraft missile arose. During the development, it was assumed that one missile, due to the large area of destruction, is capable of shooting down several enemy bombers at once. AND

this was quite realistic, since the Anglo-American bomber aircraft at that time often used such a variant of a very close formation as a “combat box”. 5

Work on the first version of the rocket, designated UL, began in 1943 in Peenemünde. Outwardly, the MI resembled a smaller copy of the A4 rocket with cross-shaped trapezoidal wings in the middle part of the hull. Stabilizers with rudders were located with an offset of 45 relative to the wings, which was done to prevent aerodynamic shading of the control surfaces in the tail section. The first tests of the ÿ1 scavenging models, carried out in March 1943, showed that these precautionary measures

ness is superfluous.

As a power plant, a liquid-propellant rocket engine was used. goy 8 thousand kgf and operating time up to 41 s. This engine

was developed by Dr. Thiel, who was also the author of the engine design for the A4 rocket. However, unlike the A4 rocket, in which liquid oxygen and alcohol were used as fuel components, for U! used fuel with UBO components! (vinyl isobutyl ether) and SV-ZoI' (Fajej - a mixture of 90% nitric acid and 10% sulfuric acid), which ignited when mixed. The transition to tacos, a long-storable fuel, was dictated by the functional purpose of the U/1: a fueled missile could be on combat duty for several weeks. :

Two fuses were located in the nose of the rocket: a non-contact one and one remotely controlled by command from the ground. Behind the fuses there was a compartment with a conventional explosive (100 kg), a container with a liquid explosive (206 kg) to increase the affected area, and a spherical cylinder 800 mm in diameter with compressed

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up to 200 atm nitrogen for boosting tanks with fuel components. Tanks with fuel components (1500 kg of $U-$10# and 450 kg of Uko!) and pipelines with locking devices were placed in the middle part of the rocket. The walls of the tanks were made of 6 mm thick phosphated steel, inside they had a protective polymer coating.

In the tail section there was an instrument compartment, servo drives for the rudders and a rocket engine, mounted on a special power frame. The instrument compartment contained: an electric battery, a generator, two hydraulic pumps, a receiver for command signals from the ground, a gyroscope for stabilizing the rocket in flight, and a fuel component mixer. Air rudders were attached to the stabilizers, which served to control the rocket in the main flight section. In the initial phase of the flight, the rocket was controlled by graphite gas rudders installed at the exit of the engine nozzle and dropped some time after launch. The power set of the rocket and its skin with a thickness of 0.5-0.8 mm were made of steel. +

The second version of the rocket received the designation No. 5. Its length and weight were slightly increased compared to the MP, and the wings were reduced with a simultaneous increase in sweep and were installed without angular displacement relative to the tail stabilizers. :

The final version of the rocket received the designation UU10. Compared to previous versions, it was reduced in size, which made it possible to save expensive materials that were in short supply at the end of the war.

The missile was aimed at the target using a ground control system, which was developed in two versions. The first variant is the Kheipapai system, the main elements of which were: a radar, a device for determining the direction of a missile's flight, a computing device, and a command-transmitting device. The system worked as follows. After a certain time after the launch of the rocket, the onboard transponder was switched on, the signal of which was received by the device for determining the direction of flight of the Kpeshjapd system. After determining the azimuth and aiming angle of the missile, the information was not transmitted to the comparator of the computer, where it was compared with the target data received from the radar. Calculated

the correction was broadcast on board the rocket with the help of a command-transmitting device. There, the received control signals were encrypted, amplified and transmitted to the rudder servos. At the initial stage of the flight, four graphite gas rudders served as the executive bodies of the control system, and after they were reset, they served as | lunar rudders on tail fins. The rudders corrected the flight path, and the rocket entered the radar beam. Once introduced into the beam, the rocket then continued to rise upward along it in the direction of the target. X

The second variant is the EBazz system, which included two radar stations (Mappzeit and Engengo19), a circularly polarized antenna system, a computer, and a command transmitter. Mupplekp Station was monitoring. target, and KNeshchro!4 behind the missile. The data of both stations were processed in a computing device and displayed on the screen of a cathode-ray tube in the form of two marks, each moving along its own trajectory. The system operator, using a joystick ("knupnel"), tried to combine the missile's mark with the target's mark. At the same time, the signals received from the joystick were transmitted by the command transmitter to the rocket, where they were transmitted to the rudder servos. |

Since both versions of the control system had insufficient guidance accuracy for the rocket that had gained supersonic speed, especially in the final flight segment close to the target, it was supposed to additionally equip the rocket with an onboard infrared guidance system. However, the development of the guidance system was delayed, therefore, to ensure the possibility of launching prototypes of the M/Azve Ai missile, a simplified non-radar model of the system was developed: the ground operator controlled the missile using a joystick with visual guidance of the missile to the target. This simplified system has been tested on some A4 rocket launches..

The plans of the German command provided for the initial placement of about 200 Mazze batteries to protect cities with a population of more than 100 thousand people, placing them in three lines at a distance of about 80 km from one another. Then the number of batteries was supposed to be increased to 300, which made it possible to protect the entire territory.

Germany's thorium from massive Allied air raids. About 5,000 missiles were required monthly to fulfill these plans. The labor input for the production of one V/azza rocket was estimated at 500 man-hours (for comparison, the A4 rocket required 4,000 man-hours). By November 1945, the first missile batteries were to be put into operation, with their number increased to 20 batteries of 100 missiles each in four months. By March 1946, the monthly production of rockets was to be 900 pieces.

Each battery was supposed to have four launch positions for missiles located at the corners of a large square platform. From the starting positions there were rail tracks to eight missile storage hangars, the ninth building was the launch control point. From each storage hangar, the rockets were to be delivered to the launch site by the launch pads. The carts were installed on vertically on special trolleys - the starting position, preceeding. a concrete slab of size -

mi 4 x4m.

In the center of the slab there was a well of square section. At half its depth there was a reflector welded from pipes. Beneath it was a layer of fairly large stones, followed by a layer of smaller stones. In the lowest part of the well there was a drainage collector, into which the rest of the non-evaporated water, supplied from the pipes in the upper part of the well, was drained to cool it during start-up.

Initially, it was supposed to attach the rocket to the launch pad using four pyrobolts, which would release it when the engine reached full thrust. However, several accidents occurred during the tests.

· ny cases but the fault of non-working pyrobolts. They either worked out of sync, or one none of them worked at all. Subsequently, it turned out that Mackerga stands steadily on the launch pad without pyrobolts and without a leash at all, even at wind speeds up to 60 km/h.

The first launch of the MI rocket took place on February 28, 1944 on the island of Oye near Peenemünde. The rocket was unable to develop supersonic speed and reached only an altitude of about 7 thousand meters. During the second launch, a speed of 2772 km/h was recorded in vertical flight. By July of the same year, 7 more launches were completed, and by the beginning of January

next year - 17 more. Of all the 25 launches performed, 24 were radio-controlled, 10 launches were unsuccessful. On January 22, 1945, an official report on the status of the Ouzze program was presented to the German high command, and on February 26 the program was terminated. However, a small amount of work on the Velsi rocket was carried out until the end of the war. Some sources claim that they were placed on combat duty. about 50 missiles, although there is no information about their combat use.

Characteristics ÿ1: wingspan - 2.88 m; rocket length - 7.45 m; maximum hull diameter - 0.86 m; takeoff weight - 3500 kg; maximum speed - 2772 km / h.

Characteristics ÿ5: wingspan - 1.94 m; rocket length - 7.77 m; maximum hull diameter - 0.86 m; takeoff weight - 3810 kg; maximum speed - 2736 km / h; ceiling - 18,300 m; range - 26.4 km.

Characteristics of the M10: wingspan - 1.58 m; rocket length - 6.13 m; maximum hull diameter - 0.72 m; takeoff weight - 3500 kg; maximum soon -

2855 km/h

eecheye

The program for the development of the Eeyei e (Fire Lily) missile began as a KIM research program, the purpose of which was to obtain data for the creation of future guided missiles. In 1941, it was decided to design the GheshegiShe as an anti-aircraft missile at the company Rheinmetall-Borsig (Keiptera!1-Boghir). The missile was developed in two modifications - ÿ25 and ÿ55, in the designation the number indicated the diameter of the fuselage in centimeters. The development was based on the results of aerodynamic studies on models obtained by Dr. G. Braun and Dr. A. Busemann from GEA.

The E25 rocket was developed to study flight characteristics at transonic speeds. The fuselage is cylindrical, with wings installed in the middle part of the fuselage. The control was carried out with the help of small surfaces on the tips of the forward swept wing and surfaces on the tail stabilizer,

working together or differentially. The Rheinmetall 505 engine was used, which developed a thrust of 400 kg for 6 s. The E25 rocket was launched both from an inclined launcher (version controlled by an autopilot developed in the Republic of Armenia) and from an aircraft (version controlled by radio). The first test launches were made in April 1943 in Peenemünde. Three rockets were launched, only one launch was successful. In July of the same year, three more E25s were launched, all launches were successful. A total of 30 Rakst E25s were manufactured.

The E55 rocket was designed to study flight at supersonic speeds; it was tailless with wings moved as far as possible to the rear of the rocket. Small rudders were located on the wingtips. It was planned to use a rocket engine as a power plant, which developed a thrust of 1000 kgf for 25 s. Engine-

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The body worked on alcohol and oxygen. The rocket was launched from the launch pad at an angle of 70'. The first tests of the E55 prototype were carried out in May 1944 using the Vreshteatz 515 solid-fuel engine, which developed a thrust of 4,000 kgf for 6 s. The tests were successful, the rocket exceeded the speed of sound. The second test with a liquid-propellant rocket engine ended unsuccessfully, and the third launch, scheduled for November in the city of Peenemünde, was never carried out.

Characteristics of the E25: wingspan - 1.15 m; length - 2.1 m; maximum speed - 840 km / h.

Characteristics of E55: wingspan - 2.5 m; length - 4.8 m; maximum speed - 1500 km / h.

Eptisp In November 1941, Dr. Lippisch, working at the Messerschmitt firm, developed a project for the Eb 10 anti-aircraft missile, which was a small copy of his Me 163 fighter. bistpeep. However, after the departure of Lippisch from Messerschmitt, work on the project was

painted. In June 1943, work on the anti-aircraft missile resumed under the direction of Dr. Wurster. Product according to

received a new EC designation (Cancer Kakege), by the end of the year the following options were developed:

EK 1 (Mun) - with a swept wing and two keels in the tail section of the hull;

EK 2 (August) - like EK 1, but without the lower keel;

EB 3 (September) - improved EK 1 with modified wing and tail section;

EV Za (September) — like EK 3, but with a simplified body; A N

EK 30 (October) - like EK Za, but with an increased wingspan;

EK 4 (October) - like EK 3, but with two kilims:

EK 5 (November) - like EB 3, but with a cylindrical body and a KI-203 engine;

EK 6 (November) - modified EK 35 with NMK 739 engine. | V

In January 1944, the project received the designation Epliap. Work on Enzian was launched at the Oberbayerischen Forschungsanstalt enterprise in Oberammergau. The first four versions of the rocket were experimental:

The Extended E-1 (February) was an EK 5, but with minor changes in the location of some components and larger keels, a few were tested in flight;

The Engen E-2 (March) was an EB 6, but with an all-timber hull, rectangular fuel tanks instead of spherical ones, and devices in the tail for

tracers, control system receivers or wire reels, the Endap E-2 was never built;

Entiap V-ZA (June) - like E-2, but with spherical fuel tanks and no control devices in the tail;

ENERGAN E-3B (January 1945) - Like E-3A, but designed for the Konrad 76 613A-01 engine, which differed from the Walter engine by using compressed air to feed fuel to the engine instead of a turbopump.

Flight tests of experimental rockets began in August 1944 and ended in January 1945. A total of 38 experimental rockets were tested, 16 of which used radio control in flight. Based on the test results, a pre-series sample of Ep was developed.

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Zap E-4. In fact, it was a variant of the E-3B, but with an enlarged body and an increased span of the tail. Wood was used as the structural material, with the exception of the steel shell of the rocket warhead, which was 20 mm thick. Production of the E-4 variant was planned at Ziddeschspep Norban in Sonthofen.

The rocket was launched from a ground-based launcher 6.8 m long using four Schmidding 553 launch boosters with a thrust of 1750 kgf each (two above the wing and two below the wing). The operating time of the boosters was 4 s, after which the boosters were dropped, and the main engine went into operation, which raised the rocket to a height of 15,000 m. The duration of the engine was 72 s, while the engine thrust varied from 2 to | thousand kgf.

The rocket was controlled in the following way. Launched from the ground or from a carrier aircraft, the E-4 rocket was aimed at the target by radio using the Koive system developed by Telefunken or the Kezi-Seasche system jointly developed by Telefunken and Stassfurt Rundfunk. When approaching the target at a certain distance, the target was captured by the homing system. The Maip infrared system or the Telefunken acoustic system were considered as this system.

Three types of warhead weighing 500 kg were developed for the E-4. The first type is presenting. It is a metal container filled with shells of 20-30 mm caliber. The second type contained 550 small propellant rockets. The third type involved the use of a conventional explosive charge.
of that substance.

In total, 60 Eplap E-4 missiles were built before the end of the war. The project was officially terminated on January 17, 1945, when an order was issued to stop work on many projects in order to concentrate all efforts on one or two selected projects. However, the work actually continued, as several interested parties, including Professor Messerschmitt, tried to cancel the order. In February, two more versions of the Entsian were developed.

Engan E-5 was intended for supersonic flight, it had four aerodynamic planes

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swept sweep and simplified body. An improved Konrad engine was used, it worked for 56 s on the ZU-buy and Vg-5:oy components, its thrust changed from the initial value of 2180 kf to the final value of 1800 kgf. Entiap E-6 with a simplified wire guidance system was proposed for use as an anti-tank missile. However

an attempt to cancel the order failed, and the project was finally terminated in mid-March 1945.

Characteristics of Entiap E-4: wingspan - 4 m, area - 5 m?; length - 4 m; maximum fuselage diameter — 0.88 m; starting weight - 1800 kg; payload weight — 500 kg; maximum speed - 300 m/s (with the Konrad engine) and 240 m/s (with the Walther engine); service ceiling — 15,000 m (with Konrad engine) and 7,000 m (with Walter engine); range - 25 km.

On 117

The development of the anti-aircraft missile Hz 117 Sÿhpeyegÿpa began in 1943 under the guidance of engineer Henrici, and in the spring of the following year the missile was ready. It looked like a small aircraft, 4.29 meters long, with a rocket engine in the tail section of the body and two boosters mounted on the top and bottom of the fuselage. The rocket had a bifurcated nose, in the right (short) part there was a generator windmill. After the launch, the solid-propellant boosters were dropped, and the flight continued with the help of the NUK 729 rocket engine. The rocket was launched from an inclined carriage. The flight range was about 32 km, the missile could be used against targets at altitudes up to 10 thousand meters. Targeting was carried out visually, control signals were transmitted by radio. From May to November 1944, 21 launches were made, with altitudes of up to 11,000 meters being reached.

In 1944, KIM and the Allied Massive Bombing Commission demanded that the development of an air-to-air missile capable of carrying a 40 kg explosive charge be accelerated. In accordance with these requirements, Henschel pre-

! i 203

- it was proposed to convert the Nv 117 anti-aircraft missile into an ” rocket. As early as May 1944 aviation one; they began testing a prototype under the designation Nv (17N ÿsÿshpeyelÿpe, first without engines, and then with a VMU 558 liquid-propellant rocket engine, a total of 28 experimental missiles were tested. The Nv 117N missile was supposed to be controlled according to radio, but it was also possible to control by wire, like the He 293V. The first serial rocket was delivered in January 1945, at the same time Professor Wagner and engineer Henrici completed the project of an improved version of the rocket under the designation Hv 117U. However On February 6, 1945, SS Obergruppenführer Kammler, the Chief Commissioner for "Weapons of Retaliation", included the HV 117H project in the group of weapons whose development must be stopped.

Characteristics of HB 117N: wingspan - 2 m; length - 3.69 m; maximum fuselage diameter - 0.35 m; starting weight — 260 kg; combat charge weight - 40 kg. maximum speed — 250 m/s; weight ZU-Zuy - 58.6 kg; weight V-Zuya - 12.4 kg; engine thrust - 380 kg; engine running time - 57 s.

H 297 - At the end of the summer of 1944, the development of a small ze

filament rocket He 297 for Eoyp launchers. It was an unguided solid rocket, stabilized in flight by rotation around its axis. Its 73 mm caliber warhead had an explosive charge weighing 0.28 kg, the missile's flight altitude was 1200 m.

Yeora anti-aircraft installations (“Swiss wind”) were intended to fight against armadas of allied bombers. The launcher was a frame into which cassettes with H5 297 missiles were inserted. Such an installation, called UECM / (Uo <- Nak-K-Megeg), was serviced by just one person, aiming was carried out by orienting the frame to the formation of enemy aircraft . In the tests, there were different versions of launchers - for 3, 5, 7, 24, 35 and 48 missiles. The launcher was transported on a trailer, and if necessary, could fire from it.

In accordance with the program adopted in September 1944 for the development of anti-aircraft missiles, it was planned until April

1945 to produce 1000 Royle anti-aircraft guns. Although production began in October 1944, by February of the following year, only 50 units had been built. All of them were in military trials.

EZede this

The nine-barreled 20-mm hand-held launcher for firing from the ground at low-flying aircraft was named ENeretsaya ("Flying Fist"). A rocket with a 20-mm high-explosive warhead and a solid-propellant engine with four jet nozzles was used. After the electric fuse was activated, the powder gases, leaving the jet nozzles, pushed the rocket out, simultaneously spinning it around the axis to stabilize it in flight. The initial speed of the rocket was 310 m / s, its rotation speed reached 26 thousand rpm. The maximum firing height was about 2,000 m, but effective firing at aircraft was carried out up to a height of 500 m.

The launcher was a simple device, consisting of nine lightweight pipes fastened with clamps, with a shoulder rest, a front pistol-type handle and a trigger mechanism; including an electric generator.. The launch of missiles during firing was carried out automatically - at first, five missiles were fired simultaneously, and the remaining four - after one tenth of a second, in order to exclude the mutual influence of jet jets of rocket engines. It was planned to manufacture several thousand Fliegerfausts in March-April 1945, but after the occupation of Germany, the Allies discovered only a small number of manufactured installations. ON

Eÿeÿtÿseÿmeg | A

In 1942, Rheinmetall-Borsig began the development of a two-stage anti-aircraft missile called Kÿeÿpÿosÿmeg (“Daughter of the Rhine”). The rocket was developed in two versions - K Ti K ÿN.

In option K | both stages were equipped with solid propellant engines, with the first stage engine developing a thrust of 7500 kgf for 0.6 s, and the second stage engine developing a thrust of 16 seconds for 2.5 s. kgf. Part

prototypes VG was equipped with two aerodynamic surfaces at the ends of the tail unit. Rocket V 1 had a length of about 5 m and a maximum diameter of 0.54 m. for 0.9 s to develop the total. thrust 14 thousand kgf, and the second stage was equipped with a Konrad engine. The Konrad engine operated on fuel components 5U-5(o4G (335 kg) and Mo! (88 kg). Its operation time was 53 s, of which 15 s the maximum thrust of 2180 kgf was maintained, and then during the remaining 38 thrust was 1800 kgf. In both versions, an explosive charge weighing 25 kg was located behind the nose of the second stage, while the acoustic fuse Kgapÿsj was located in the nose. The control was carried out by radio, the operator monitored the tracers during pointing at the ends of the rocket stabilizers.

The first experimental launches began in August 1943; by the beginning of January 1945, 82 rockets had been launched, of which only four had failed. However, on February 6, 1945, all work on the Kleshnostet rocket was stopped, since it became clear that it could not be brought to a state of combat readiness in time.

Tayyip

It was an unguided anti-aircraft missile, developed by the firm Gie Gotescapizschep Megke to combat massive raids by enemy bomber aircraft. The rocket was equipped with a liquid-propellant rocket engine that operated on the U-buy (8.3 kg) and E-$®y (2.5 kg) components and developed a thrust of 800 kgf for 2.5 s. Tainp had a length of 1.93 m, stability in flight was provided by the rotation of the rocket around its axis. The warhead contained an explosive charge weighing only 0.5 kg. The missile was capable of reaching speeds corresponding to the MOH, and could reach altitudes of up to 15 thousand meters. It was assumed that up to 30 missiles would be placed on the launcher. Tests of the rocket, however, were not completed before the end of the war.

17. AIRCRAFT ROCKETS

x-4

At the beginning of 1942, Dr. Kramer from OMI. began work on the rocket, which at KIM received the designation 8-344. A year later, the Rurshtal company (Kiÿgza rge megkep) was connected to the work, on which, under the leadership of Dr. air". In June, the Ministry issued an order to speed up work on the rocket, which was assigned the designation KK 344 in the BEM. The engine for this rocket was developed from January 1943 by VM \ U under the R.3378 project and soon received the designation VMY 548. The first five samples engines were manufactured at VMU/ by April 1944, however, during the tests, only two samples turned out to be operational, and the engines could develop thrust no higher than 110 kgf. The error was eliminated by increasing the consumption of the oxidizer, which made it possible to achieve the calculated thrust value.

The Kh-4 rocket had a cigar-shaped fuselage with small cross-shaped wings in the middle part of the fuselage and a tail stabilizer with four control surfaces rotated by 45' relative to the wing planes. The fuselage consisted of three sections: a steel nose that contained the warhead, a cast aluminum center section, and a tail section made of aluminum sheet. The wings were made of plywood. The rocket was designed so that unskilled workers at the plant could assemble

rockets. 207

At the ends of one of the pairs of wing planes there were containers with coils of wires of the control system, which were unwound during the flight of the rocket. Tracers were placed at the ends of the planes of the other bunk, along which the pilot visually controlled the rocket. The VMÿ 548 liquid-propellant rocket engine was used as a power plant, operating on two components - K Boy and 5-5poi. The oxidizer 5-5yu weighing 6.7 kg was stored in a tank, which was a spiral made of an aluminum tube with an inner diameter of 28 mm, wound along the contour of the fuselage skin. Inside it, there was another spiral made of a tube 22 mm in diameter, in which the Yo-5(01ÿ) component weighing 1.8 kg was stored. The components were fed into the engine combustion chamber using compressed air stored at a pressure of 120 atmospheres in two steel cylinders located inside the spiral tanks. At the time of the rocket launch, pyro valves were activated, through which air was supplied under the elastic pistons in each spiral tank with a decrease in pressure in the reducers. Under the pressure of the pistons, the components entered the engine combustion chamber, where they were mixed The engine developed a thrust of 140 kg at the time of launch, after 30 seconds of operation the thrust fell to 30 kg.A warhead weighing 20 kg was placed in the nose of the rocket, which, depending on the modification of the rocket, could be actuated by contact or non-contact (acoustic) fuse tuned to the noise of the bombers' propellers, as well as manually by the pilot.

During the attack, the carrier aircraft launched an X-4 missile at a target from the rear hemisphere with a slight excess in height. The X-4 rocket was mounted on a standard one. bomb holder, in flight the rocket rotated around its axis at a speed of one revolution per second, the gyroscope served to maintain a given flight path. The pilot controlled the rocket from the cockpit of his aircraft with the help of a small control knob of the PaS 510/238 Pizzeots/ Peyto14 system. 7 s after

launch, acoustic and contact fuses were put on alert. The acoustic fuze Kmapis was tuned to the noise of the bombers' engines so that the detonation of the warhead occurred at a distance of about 7 m from the target. During

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During tests, it was found that the detonation of a warhead at a distance of 5-6 m from the target leads to catastrophic destruction of a four-engine bomber. In case of missing the target, the missile was destroyed by a self-liquidator, which was activated approximately 30 s after launch. The optimal attack range was between 1.5 and 3.5 km, although the length of the wire with a diameter of 0.2 mm on the reels was 5.5 km. Later, it was planned to switch to wireless control with the help of the navigator system. |

The initial production of missiles was deployed at VMUU-Uyetka (Berlin-Spandau) and Setaieugerge (Stargard). By August 1944, 225 X-4 prototypes were built, the first flight launch was carried out on August 11 from the E-190 aircraft. two X-4s under the wing on the outside of the engines, but no missile launches were made. Test launches of the X-4 prototypes were carried out at the VMU/Dachauer Mohr test site and in Peenemünle jointly by EMUU employees and the UKM test team (Megviszkottapdo Moga). During ground launches, a range of up to 3500 m was achieved, during air launches up to 5500 m.

At the beginning of January 1945, it was planned to supply 19,850 missiles for 1945; in addition, the SS command demanded that additional production of 3,000 missiles be launched to carry out special operations. This missile was designated as Segai 78, this project was developed in two versions at VMUU: the first version had a length of 1.54 m and a span of 0.865 m, the second version had a length of 1.69 m and a span of 0.78 mm. In terms of weight, both variants slightly differed from the Kh-4 missile. 3

Approximately 1,300 rockets assembled at the Rurstahl (Koig'ape) plant in Brakwede and destined for delivery to Luftwaffe units were waiting for their engines when the VMU/ plant in Stargard was bombed by Allied aircraft in January 1945 , destroying the entire stock of VMU / 548 engines prepared for shipment. Under these conditions, KIM demanded to switch to the use of the Schmidding 603 solid-propellant engine, developing

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I lay down 150 kgf for 8 seconds, but the Germans no longer had time to produce a new batch of engines. In addition to the test launches that began in August 1944, there were plans to use the X-4 in military tests

- accurate front with launch from ground installations, combat
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but there was no use from aircraft until the end of the war. On February 6, 1945, a decision was made to stop the production of X-4 missiles.

Characteristics of X-4: wingspan - 0.725 m, area - 0.44 m?; length - 1.91 m; maximum fuselage diameter - 0.22 m; weight - 60.5 kg; maximum speed — 1152 km/h; maximum engine operation time — 33 s; engine thrust - 140 kgf.

Nz 293

In 1939, the company Cogley Singaggi ProreNegiegke developed a project for a glide bomb controlled by an autopilot. This method of control required bombing from high altitudes in order to provide the bomb with a sufficient flight range, and the aircraft to be outside the range of enemy anti-aircraft artillery. Therefore, it was decided to use the engine, turning the bomb into a rocket, in order to enable attacks from

low altitude and at a great distance from the enemy, at the beginning of 1940, the Henschel firm was involved in the work.

Under the leadership of Dr. Herbert Wagner, the Nv 2934 anti-ship guided missile was developed. The power plant, which consisted of the NUK 507 liquid-propellant rocket engine, was located in a separate gondola suspended under the missile body. The Walther liquid-propellant rocket engine operated on 2-0 fuel (aqueous solution of sodium permanganate or calcium permanganate) and T-zuy oxidizer (concentrated hydrogen peroxide). The rocket engine could provide 600 kg of thrust for 10.s. A flash beacon was installed on the tail of the rocket, which allowed the operator to track the flight of the rocket at a great distance and in conditions of poor visibility.

The warhead, located in front of the hull, was a standard 500-kg $C 500 bomb.

Since this bomb was not armor-piercing, the H5 293A missiles were intended to attack merchant and other unarmored ships. The length of the rocket body was 3.82 m, the total weight was 1045 kg. The control of the Hb 2934 missile was carried out with the help of the Keÿÿ-Sgaÿbigr system. The missile receiver was pre-tuned to one of the 18 available frequencies in the 48-49.7 MHz band, which allowed 18 bombers to simultaneously launch one missile at a time and control their missile without interfering with each other.

In addition to the Nv 2934 variant, several more modifications of the rocket were developed, including:

Nv 293V - with a wired control system (coils with wires were on the wing), designed to be used in case of radio interference by the enemy. Hz 2938 was not mass-produced;

H5 293C - with a cone-shaped detachable warhead that could float under water like a torpedo. Only a few were built;

Not 2930 - with a television control system using radio or wire communication. In 1942, about 20 Hv 2930 rockets were built and tested in flight, but the television mechanism proved unreliable and the project was abandoned;

Hv 293E — experimental model for testing various variants of aerodynamic control surfaces;

H5 293E - a tailless missile project that has not received further development;

Hv 293N (Riklegoreg-Kakege) is a variant of the missile designed to destroy formations of allied bombers.

In combat conditions, only the Hv 2934 variant was used, first Po 217 was adapted as a carrier aircraft, and then He 111, He 177 and E "200. When performing a combat mission, the aircraft carried two Hv 2934 missiles, one under each wing console . To prevent freezing at high altitudes and failure of the control system, warm air was supplied to the rocket from the aircraft engines. After detecting the target, the bomber approached it so that the target of the eye

zalasv to the right of its course by 30-60 '. At the time of the rocket launch, it was required that the aircraft fly strictly horizontally at a speed of 334 km / h (for the He 111) or 400 km / h (for the He 177 or Oo 217). The rocket engine turned on immediately after its reset. After the distance between the rocket and the aircraft reached 90 m (10 s of flight time), the rocket engine reached its maximum thrust. The bomber smoothly turned to the side, and then continued

fly parallel to the rocket. The bombardier visually observed the missile from the tracers in its tail section and controlled the missile using a small remote control with a control stick. The operator's normal field of view was approximately 110° to the right. The flight time of the rocket did not exceed 100 s.

For the first time Hs 293A was used on August 25, 1943, when Po 217E-5 aircraft from P / KO 100 attacked Allied destroyers in the Bay of Biscay. And on August 27, 1943, the British patrol ship “Egret” was sunk by the Nz 293A missile. Luftwaffe aircraft made numerous raids in October and November against Allied convoys in the Mediterranean, using the HB 293A to attack the escort ships so that the following J and 88 torpedo bombers could attack passenger and cargo ships without hindrance.

However, the air superiority of the Allied aviation was increasing, and when the Allies landed at Anzio in January 1944, the German bombers encountered fierce opposition from the Allied fighters and began to suffer heavy losses, although they managed to sink the English cruiser " Spartan. The main disadvantage of using the Hv 293A was that it was impossible for a bomber to evade fire with this method of missile guidance.

anti-aircraft guns.

Allies after some time began to apply electronic measures to counteract the operation of the control system KeN-Z! TazzByte. One such measure was a broadband transmitter that simply jammed the radio noise control signals. The other system was more subtle, a spoofbomb ("dummy bomb"), which sent false signals to the receiver of the missile's control equipment, which led to jamming of the controls.

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rocket surfaces in extreme positions. This caused the missile to dive or spiral. The Luftwaffe attempted to attack the Allied fleet during the Normandy landings in June 1944, but the German bombers were unable to effectively penetrate the Allied air defense zone. As a result„ a few launches of radio- · jamming. 3
After the first experience of using the Hz 293A appeared, you were incapacitated with help
in 1943 a small number of destroyers of the Hz 293N system with the Schmidding engine (ÿsippÿy ne) 543 were built. Method. The use of the missile was relatively simple: the NV 293N had to be dropped from a carrier aircraft with an excess of 600 to 2000 m above the formation of allied bombers. The missile was equipped with a guidance system, which was supposed to direct it at the target with an accuracy of 50 m. According to the plan, the following missile variants were developed: Hs 293N-1 - prototypes, Nv 293N-2 - an improved version, Nv 293N-3 ?A? . Magdeg - with an acoustic guidance system Magdeg, Nv 293N-4 7A7. Kakadi - with acoustic guidance system Kakadi, H5 293N-5 - with television guidance system, HE 293N-6 - with barometric guidance system, Nv 293N-7 1/% -2A7. - with an infrared guidance system, Nv 293N -! a - serial samples. However, military tests of the Nv 293N missile were carried out with an already developed radio guidance system.

In total, more than 2300 were built during the war: Nv 293 missiles.

Characteristics of HB 293A: wingspan - 3.1 m, area - 2.4 m; length - 3.82 m; maximum fuselage diameter - 0.47 m; flight weight - 1045 kg; combat charge weight - 500 kg; maximum speed - 260 m / s; the minimum turning radius is -800 m; maximum overload — Sv.

Not 294 E

As a rule, damaged enemy ships, after being hit by He 293 missiles on board above the waterline, remained afloat, and they could be towed to the port for repairs.

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Therefore, in order to enhance the damaging effect upon impact, the Nv rocket was developed in 1941
294, which the final section of its trajectory passed under water and hit the target below
waterline.

The H 294 was similar to the Hs 293S, but had a narrower warhead and two NU\UK 5070 LREs with thrust
1300 kgf each (working time 10 s). A missile launched from a carrier aircraft had to enter
into the water 300-400 m before the target, and when entering the water, the aerodynamic surfaces
dropped. The body of the rocket, which turned into a torpedo, moved towards the target under water at a speed
230 km/h The first launch of the prototype took place in 1941, He 177 and ÿi 290 were used as carrier
aircraft. ,
missiles speed, at-

- I had to refuse. It was supposed to use jet as a carrier
bomber Ag 234C, a towed version of the Hv 294 was developed for it. |

Later versions of the H5 294 prototypes were experimentally equipped with a rocket engine.
109-573, who worked underwater. The length of such samples was increased to 7 m, and the diameter
the hull was reduced to 0.535 m, such samples received the designation ST 1200A (ST - glide torpedo).
The subsequent modification received an ob-7.35 m and was , value OT 12008, it had a length
equipped with an acoustic guidance system. Total built: 20 Hb prototypes
294U1, 45 Na 294/2 prototypes, about 80 Na 2944-0 missiles, and 20 NV 2941) with television control. |

Characteristics of HB 294A-0: wingspan - 4.03 m, area - 5.3 m?; length -6.11 m;
maximum fuselage diameter - 0.62 m; flight weight - 2170 kt; payload weight - 630
kg; maximum speed - 245 m / s.

H5 295/H5 296

At the beginning of 1942, work was also carried out on the Nz 295 and Nv 296 missiles with warheads weighing
respectively 1000 and 1400 kg. Both missiles were powered by two engines
NUK 5070. Nv 295 guidance was carried out for the first samples by radio, and for the subsequent ones -
by wire. Several samples under the designation

The HB 2950 was tested with TV control. Nv 296 was a modification
rocket H$ 293 N, carried out under the direction of Dr. Rombusch from the Physical Research Institute
in Dressenfeld. The missiles of both versions were built in small quantities, were not mass-produced
and were not used in combat operations. |

Characteristics of HB 295: wingspan - 4.09 m, area - 5.4 m?; length - 5.44 m;
maximum fuselage diameter - 0.55 m; flight weight - 2090 kg; payload weight - 585
kg; maximum speed - 235 m / s.

At 298 g ca 5

The first sample of the Hv 298 rocket was developed in 1941 under the guidance of Dr. Wagner, however
KIM was not interested in the project at that time. And only in 1943 urgent work began on this
rocket led by Heskey.

The rocket was made according to the normal aircraft scheme with a spaced tail.
A two-chamber solid-propellant engine 8S 32 was used as a power plant.
firm "Schmiddint", which later received the designation 5sÿtpiydÿpr 543. At the initial stage of the rocket
flight, the first chamber worked for 5 s, creating a thrust of 150 kgf, after that, in
the second one entered the work, creating a thrust of 50 kgf for 20 s. At the end of the lower rod of the rocket
there was a windmill power generator. The engine was located in the lower part of the case,
the jet nozzle was turned down at an angle of 30" so that the thrust vector passed through the center

the gravity of the rocket. In the upper part of the body was placed the equipment of the remote control system EoC 232 Coitar, which received signals from the radio transmitter Ken! from a carrier aircraft. The missile was launched at a distance of 1.5-2 km from the target at a speed of about 500 km/h.

The missile in the final section of the trajectory was aimed at the target using the Kakadi acoustic system with an accuracy of 10 m. However, vibration from the engine operation often affected Kakabi's performance. Therefore, other variants of the systems were also considered: Max, Mahilishap, Kire, Madna, and Natbigr. 5

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:. The first batch of missiles was launched into production in March 1944, they were supposed to equip the Ru 190, Po 217, Ya 88O-1 and Ya 388 aircraft. However, the first launch of the He 298 \ 1 rocket took place only on December 22, 1944, further tests showed that out of three missile launches from an aircraft, only one was successful. Therefore, in the future, a transition to the Kesh/Ztazvbige control system (Rob 203/ NiS 230) was envisaged, and in the future, to the Kovee system (EC 512/ECO 530). However, the tests were unsuccessful, so on February 6, 1945, the production of HE 298 was discontinued.

It must be said that in September the Henschel firm offered a more powerful sample of the rocket, the prototype of which was the Hv 298 U2. factory in Wansdorf shortly before it was captured by the Soviet troops. The total number of built H $ 298 was about 400 copies.

`Characteristics of H$ 298 U1: wingspan - 1.29 m, area - 0.42 m?; length - 2 m; hull width - 0.205 m; hull height - 0.42 m; flight weight - 95 kg; the weight of the boss charge is 9.5 kg; maximum speed - 234 m / s; range - 1.6 km. TO

Characteristics H $ 298 U2: wingspan - 1.27 m; length - 2.55 m; flight weight - 124 kg; combat load weight - rad - 48.0 kg; maximum speed -- 175 m/s; range — 2.0 km.

kam

It was an unguided rocket with a diameter of 55 mm, developed by NeBeg. The stabilization of the rocket in flight was carried out by a shank with eight guides. Me 262 type fighters could carry wooden racks (launchers) with twelve K4M missiles under the outer part of each wing console. With a range of 1500 m and a 0.5 kg warhead, they were very effective against allied bombers. There was also a version with a HEAT warhead for action against armored targets. Since the ballistic characteristics of the rocket were close to those

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30-mm projectile from the MK 108 aircraft gun, then when firing rockets, a Keui gun sight was used. Characteristics: plumage span - 0.242 m; length - 0.81 m; diameter - 0.55 m; rocket weight - 3.85; combat charge weight - 0.52 kg; speed - 525 m / s; range - 1500 m.

zl.

Rocket project 3/1. with a ramjet engine was developed in 1944 under the direction of Dr. A. Lippisch. The shape of the rocket resembled his supersonic fighter interceptors No. R.12 and M R.13. It was supposed to use coal nyl as fuel for the engine, the engine thrust was 7 thousand kgf. It was supposed to make the shell of the warhead and the wing of the plastic explosive ro. The project was not implemented.

Characteristics 3/1: length - 3 m; wingspan - 1.5 m, area - 2.25 m ?; weight - 250 kg; fuel weight - 105 kg; combat charge weight - 100 kg; range - 530 km.

5E 1000 V5/KEMU

In the summer of 1943, Rheinmetall-Borsig developed an air-to-ground missile under the designation ZE 1000 V5 / KEM, equipped with a solid-propellant engine. Tests were carried out on prototypes 5E 1000 K-| 2.205 m long with a four-plane and six-plane tail unit. In the suspended state of the rocket under the holder of the carrier aircraft, its tail surfaces were folded, and after launch, the plumage was opened. ¢

Characteristics of 5E 1000 KS/KIM: rocket length - 3.13 m; warhead length - 1.42 m; tail span in open form - 1.68 m; maximum hull diameter - 0.65 m; weight - 1015 kg.

T.

Under this designation, in 1943, "projects were developed for heavy air-to-air missiles with a turbojet engine. These missiles were designed to fight

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with armadas of allied bombers. As a power plant, the Rogvsye 005 turbojet engine developed by Professor Porsche, a similar engine from VMU / and others were considered. After the appearance of prototypes of the Nv 293N rocket, all work on the TI projects was stopped.

Titettoschep

The 2-Shettoscheep rocket project was developed under the guidance of Professor Wagner from the Henschel company. The rocket wing had a small positive sweep along the leading edge and a large negative sweep along the trailing edge. Two LRE NUUK 507 were attached to the sides of the fuselage from below. The tail T-shaped plumage was installed from the bottom of the rocket body. At the beginning of 1945, models were blown through in the wind tunnels of the AUA Institute (Göttingen).

18. PLANNING BOMBES AND AIRCRAFT TORPEDOES Before the outbreak of the Second World War, the KIM began work to study the possibility of creating glide bombs (OV - Slenrotre), the leading scientific research institutes of the Luftwaffe - the Research Institute of Gliding (Gliding Research Institute) were connected to these studies (REZ), Aviation Research Institute (BUT), Aviation Research Center. G. Goering (NAP), Institute of Hydrodynamics named after. Kaiser Wilhelm (AUA) and others. Subsequently, the designation SV in German documentation was used not only for the actual planning bombs, but also for bombs equipped with one or more engines.

Experimental projects YuE5 and OM In 1938, the BE5 institute received an assignment from the VGM to develop a glide bomb (CB), which at the final . during the flight phase could reach a speed of 360 km/h at a glide angle of 1:5. In accordance with the terms of reference, the bomb had to have: wingspan - no more than 2 m; length - no more than 4.5 m; body diameter - no more than 0.5 m; weight - 500 kg. The final speed requirement was later increased to 720 km/h. REZ began to develop two directions. The first direction - the development of bombs with round and elliptical wings - was headed by engineer Muttray, and the second direction - the development of bombs with trapezoidal and swept wings - was headed by engineer Feder.

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The first bomb was developed under the designation PE8-1. Prototypes were produced by the company 5sugar?-Rgoreyegiekets (Berlin) and for reasons of secrecy were called KZA (Kapshugar? - Smoke trail machine). During testing, this model

demonstrated poor handling characteristics. From January to June 1940, a new model O5-13 was tested, which also had the designation KZA-160, with the Azkapa control system, the tests were held with varying success. In further tests, we used devices from the company ApzsNitg for control, but also did not achieve sufficiently stable flights. Models PE$-P, later renamed 95-24, received a round wing, but still their performance was not stable. Samples of the Yu2% bomb with rectangular wings, on which end plates were installed, showed good results, but they were abandoned because of the high cost in production. Engineer Feder in March 1941 proposed a project for the SV 4 bomb, in which the wing sweep angle could vary from 15 to 45.

Institute OM1, developed samples of bombs under the designation SU (SU - ÿÿÿÿÿÿÿÿÿÿÿ) and SV 200. In September 1940, samples SV 200 numbered 139 and 140, when dropped from an aircraft Po +72 from a height of 1500 m, reached a range of 13, 2 km and. 13.3 km respectively.

The accumulated experience in the development of experimental models was used from the autumn of 1944, when the VM set the task of developing industrial models of planning bombs,

Main characteristics of experimental glide bombs:

CB 200 | SULIN 2.47 | 2.93

1,368 | 1.32

0.71 | 0.71

0.865 | 0.84. h0 | 17

Tailless Bombs Sony

In 1940, REZ began work on a series of glide bombs without a tail. The model A bomb was developed first, and from March to August 1941, prototypes weighing 550 and 650 kg were tested. Then the models B-1, A-2, B-2a, B-26, B-2s were developed. All these models had a vertical plumage in the bow of the hull. Comparative BE tailless bomb models

current:

630 | 800 | 800

1200 2.0

Weight, kg Wingspan, m

St IE

In January 1941, REZ proposed a bomb design for the SV IK Ki eyuetk with an annular tail. This bomb was a further development of the experimental model OE$-{. In the middle part of the body there was an elliptical wing with a transverse Y of about 12. The tail ring had a width of about 40 mm. This model was tested in the wind tunnels of the AUA Institute.

Characteristics of SV IR: wingspan - 0.664 m; area - 0.173 m2; length - 1.55 m; maximum hull diameter - 0.166 m; tail ring diameter - 0.22 m.

pE5 / p-i- ire)

The OE5/0-P (Re) Seyipa (Seal) project was a joint development. PE$ and rocket center in Nenemond. The first prototype bomb weighed 450 kg,

the aerodynamic surfaces were controlled by a pneumatic actuator. Then a sample weighing 560 kg was developed, the basis of which was a standard 5C 500 bomb equipped with a trapezoidal wing, the aerodynamic control surfaces were driven by an electric drive.

The images were tested in Peenemünde with a discharge into the Baltic Sea. The bombs tested were supplied

rescue parachutes, impregnated with a fluorescent composition that glowed greenish in the water, which guaranteed the rapid location of the bomb. A waterproof tail container with measuring equipment could be used in subsequent tests. In the case of organizing mass production, it was supposed to place a gyroscope and control equipment in the tail container. A variant of the 2000-kg Beishd bomb was developed, which carried 1000 kg of explosive. However, after testing several samples, work on the O-P bomb was discontinued.

Characteristics of OEZ / O-P (Re): wingspan - 1.6 m, area - 1.92 m; length - 3.4 m; maximum hull diameter - 0.45 m; maximum speed - 104 m / s.

SV Nesin:

In July 1939, KI.M asked the GRA about the prospects for the development of glide bombs. A year later, a project for a trapezoidal wing bomb was ready, two prototypes 1.65 m long were tested in flight. The next version of the bomb received the designation Nesi! ("Pike") K-1750, in October 1941, several prototype bombs of this variant were manufactured by the Rheinmetall-Borsig company.

This was followed by Nes K-2010 with a length increased to 2.01 m. The wingspan remained the same as in the previous version, but the dimensions of the tail were slightly increased. At the end of 1942, the IRA presented another bomb project under the designation Porretshor!-OV with a rocket engine with a thrust of 2000 kg (burning time 6 s). This 900-kg bomb was supposed to consist of two bodies connected side by side with a diameter of 0.45 m each, the wingspan was 2.0 m. Since Nv 293 missiles were already in production at that time, the bomb projects Nesin. postponed in order to use them later for the development of the Nesi K-2700 missile, which became the forerunner of the Rezeyshe E25 and E55 anti-aircraft missiles. 、

Characteristics Neshy K-1750: wingspan - 0.588 m; length - 1.75 m; the maximum hull diameter is 0.177 m.

SV-Topdet

In June 1942, under the direction of Dr. Rüden from the OE5 branch in Ainring, a biplane-tandem glide bomb was developed. At the ends of the wings there were vertical rectangular washers, in the tail part - the upper and lower keels. Billy tested several samples, but the project did not receive further development.

Characteristics of SV-Tapfet 500/2: wingspan. - 1.78 m, area - 2 m?; length - 3.98 m; maximum hull diameter - 0.47 m; tail span - 0.85 m.

Wu 246

At Blom and Foss, under the direction of Dr. R. Vogt, a planning bomb was developed under the designation Vu 226. This bomb was proposed as an alternative to the E1 103 rocket, it was supposed to equip bombers He 111H and IA 88A with them. The Wu 226 bomb was supposed to

dropped from a height of 7,000 meters at a speed of 550 km/h and reach a range of 210 km, while the speed of the bomb near the ground decreased to 450 km/h. Since after the first tests the hitting accuracy of the Vu 226 did not exceed the corresponding characteristics of the U1 rocket, the KI.M rejected this project. The KIM project was again remembered in the summer of 1943, after which it was planned to resume work, under the new designation Vu 246 Narejkot ("Gradina"): on July 2, 1943, tests began in Karlshagen. Vu 246 prototypes, military tests were carried out in the bombing squadron KO 101 in Greifswald.

Tests with the help of Lee 188 E-| (serial | serial number 260393) did not give positive results. The planning angle of the bomb and the accuracy of its hit did not meet the requirements of the terms of reference, however, in December 1943, a decision was made to launch the product in a series. E

Nare Kop had a cigar-shaped fuselage and a thin wing of high elongation, the tail unit was spaced apart, in contrast to the Wu 226, which had an asymmetric cruciform tail unit. Pervona

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Initially, it was supposed to control the bomb by radio from a carrier aircraft, but the interest in the Wu 246 from the German command gradually began to decrease. The reason for this was the successful development by the British of methods to counter the operation of radio control systems. The Vu 246 program was terminated on February 26, 1944, although testing of some samples continued further - in KO 101. In early May, the production of Vx 246 was finally terminated, by this time there were only 550 copies of the Vu 246V, suitable for use as unmanned targets for training anti-aircraft crews. The Vu 246 program resumed at the beginning of 1945 under the new name Vu 246 Kaiyesszhep ("Radish"), this modification was intended to destroy enemy radars. The Vu 246 Kafezshep gliding bomb had a slightly increased length and a modified nose to accommodate an ultrashort-wave guidance system. Ten samples of the Vu 246 Vayescep were tested at the Unterluss training ground, but due to the fact that the new guidance system had not yet been worked out, eight devices were lost due to accidents. Two launches were nevertheless carried out successfully - the bombs hit the target with a deviation of no more than 2 m. Although about 1100 copies of the Vu 246 were built during the war; however, none of them were used in combat conditions. Characteristics of Wu 246: wingspan - 6.4 m, area - 1.47 m; length - 3.53 m; maximum fuselage diameter — 0.54 m; flight weight - 730 kg; combat charge weight - 435 kg; maximum speed - 450 km / h,

vm 1 10 R

Apparatus Vu G. 10 ÿÿÿÿÿÿÿÿÿÿÿ ("Angel of Peace") of the company "Blom and Voss". It was a small glider with a straight wing and a spaced tail, carrying a standard ET 950 torpedo weighing 765 kg. The on-board system provided control of the flying torpedo in flight.

Vu G 10 was dropped from a carrier aircraft at an altitude of 2500 m. Already 3 s after the drop, small air was released from the container under the left plane of the vehicle.

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a kite on a cable 25 m long. When Wu T. 10 was above the surface of the water at a height of about 10 m, the kite touched the water and turned on the electric fuses of the pyrobolts that attached the GT 950 torpedo to Vu I, 10. Further released torpedo half water was directed to the target.

The first experimental batch of 54 samples began to be tested in September 1942 in Peenemünde and Gotenhafen-Hexengrunde. The total number of built by Wu Ye. 10 of all different variants until the end of the war amounted to about 450 copies, of which 136 pieces

were used up in trials and 34 units were used in military trials in the KS 26 squadron.

Characteristics of Wu G. 10: wingspan - 2.8 m; length - 3.89 m; maximum fuselage diameter - 0.44 m, flight weight (without torpedo) - 218 kg; maximum speed - 87 m / s; range - 9 km.

Wu 143

Blom & Foss developed the Vu 143 gliding torpedo (Sysigogreyo) powered by the NUK 502 (KI-210) engine. The torpedo, after being dropped from an aircraft at a distance of 5–7 km from the enemy ship, was supposed to descend to the water along a gentle trajectory, after which the rocket engine was turned on, and it continued to fly above the water surface at a height of about 2 m, aiming at the target with using the Nutbigr infrared system located in the forward part of the hull. To keep the torpedo above the water, a control system with a special height sensor was used. Various types of sensors were investigated, but in the end. stopped at the contact shupe. The engine worked for 40 s, during the first 30 s the thrust was 1500 kgf, and in the next 10 s it was 700 kgf. When the Vu 143 was launched from a carrier aircraft at a speed of 430 km/h, the torpedo in the final section of the trajectory had to gain speed of 730 km/h.

Tests with the He 111N-6 carrier aircraft began in February 1941, at the Zinnowitz training ground near Peenemünde. Although about 35 samples were tested by the end of spring, 4 of them were shattered from a catapult, problems under

8 M. and V. Kozyrevs 225

maintaining a given flight altitude above the water has not been resolved. Therefore, after the manufacture of a small series of Vu 143A torpedoes, production was stopped. However, the Kriegsmarine became interested in the catapult version of the torpedo, so the Blom and Voss company switched to developing a version of the torpedo for the fleet, which could be launched from ship's catapults. The ejection variant received the designation Vu 143V, it was outwardly very similar to the Vu 143A, but differed in the increased size of the aerodynamic surfaces. At least one copy of the Wu 143B torpedo was tested from a catapult; but military tests were not carried out. The total number of Wu 143s built was about 450. Characteristics of Vu 14ZA-2: wingspan - 3.13 m, area - 2.4 m?; length - 5.98 m; maximum hull diameter — 0.565 m; flight weight - 1073 kg; explosive weight - 180 kg; maximum speed -- 205 m/s.

RS-05

A series of RS-K$ anti-ship bombs with rocket engines included three variants: RS 500 V$ Raite, RS 1000 V5 Po and RS 1800 #5 Rapÿÿeg. All three variants were structurally similar, they contained a warhead (a standard armor-piercing bomb of the RS type), the middle part of the body and the tail section, which housed a solid propellant rocket engine running on dinitroglycol. The tail section was a steel cylinder, on which there were 12 stabilizing surfaces, 6 nozzles were located in its end part.

For

. exit of combustion products and a safety valve to maintain the pressure in the combustion chamber at a given level. The rocket engine was switched on 2.5-3 s after the bomb was dropped from aircraft.

The largest bomb from this group, the RS 1800 V5, had a ground speed of 972 km/h and could penetrate 180 mm thick armor. During testing of the bomb engine, it was possible to achieve a thrust of 18 thousand kgf. It was assumed that, having penetrated the armor, the warhead would explode inside the ship, which guaranteed its sinking. In total, more than 1000 bombs of all variants were made.

Characteristics of RS 1000 K5: length - 2.22 m; maximum diameter — 0.395 m; weight - 1040 kg; the weight of the explosive is 65 kg.

Characteristics of RS 1800 V5: length - 2.69 m; maximum diameter — 0.536 m; weight - 2115 kg; the explosive weight is 230 kg.

. Forgiveness

The anti-tank Bomb Diorgebopye was equipped with a rocket engine. It was intended for automatic reset by signals from magnetic sensors when the carrier aircraft passed over the magnetic field created, for example, by the accumulation of tanks on the ground. Bomb tests at the end of 1944 gave positive results, but further work was stopped due to the lack of suitable carrier aircraft with a low intrinsic magnetic field.

EB: Professor Wagner proposed the design of a submersible anti-ship bomb of the EB series (Eyizisi-botbei). It looked like an ordinary bomb with an elongated nose and was equipped with plumage with a tail ring, which remained on it even after entering the water. The nose of the bomb had a ring ledge to stabilize the movement of the bomb in the water. The bomb was developed in "three versions - EB 250, EB 560 and EB 1440. Prototypes were purged in the TEM wind tunnel in July 1943. The EB 1440 project had not yet been completed when it was decided to replace these bombs with BT bomb torpedoes.

Characteristics EB 250: length - 2.3 m; tail ring diameter — 0.5 m; weight - 102 kg.

Tue

In the spring of 1943, the GA Institute, on the instructions of the KEM, conducted research on a new method of attack using bomb torpedoes, which, according to calculations, seemed to be more effective than conventional aircraft torpedoes of the GT type.

a 227

Tests of prototypes showed the following results: the VT 1000 bomb-torpedo, when entering the water at an angle of 20', had a range under water of about 2800 m with an accuracy of +25 m.

The development of industrial models of bomb torpels was transferred to the EU company, and the manufacture was entrusted to the Tgirre!megke automobile plant in Molsheim. Initially, it was supposed to use a standard Keui-G torpedo sight with a time counter during launches, but during the tests they could not achieve the required accuracy. Therefore, the development of a new TSA sight began. To ensure rectilinear movement after entering the water, a stabilizing ring was installed in the bow of the hull of the bomb torpedo in the first versions, later a device called 7mÿÿÿÿÿÿ (“Onion”) was used. The shanks of the VT 200, VT 400 and VT 700 bomb torpedoes were made of tin, they simply broke off when entering the water. Larger VTs had strong steel shanks, which were fired with pyrobolts upon entering the water.

Several VT 400s were tested on the Eu 190E aircraft, in addition, the issue of mounting the VT 7008 under the wing of the Vu 40 fighter glider was considered. were

removed from the aircraft.

Work was underway to equip the VT 1000 with a Riga solid-fuel engine developed by Rheinmetall-Borsig. The engine, 0.965 m long and 0.4 m in diameter, had 6 jet nozzles. Such a bomb torpedo, which received the designation VT 1000 K5, when dropped from a height of 1000 m, should have a range of 6200 m and a speed near the water of 960 km/h. Work was also carried out to equip the nose of the Me 328A projectile with a VT 1000 bomb (without an engine), which was planned to be used in the KO 200 squadron for operations against large ships.

In July 1944, during tests,,the following accuracy results were obtained: "
hitting the surface. target: +37 m in range and +27 m in lateral deviation niyu.
Successful tests were also carried out with the release of BT 1400 bombs on soft ground (swampy
soil, silt, pe

juice), after which they planned the use of such bombs

against ground bunkers and similar structures. However

in February 1945, all work on the VT was canceled, a small

the number of bomb torpedoes used in military is

torture. - VT characteristics:

Length, m Tail span, m Max. diameter, m Bomb weight, kg Charge weight, kg

4.69 116 0.62

1923 1050

EX 1400

The radio-controlled planning bomb EX 1400 (Epi-X) is designed to attack large-sized
targets such as battleships. At Rurgital AG, the manufacturer, the bomb was also
known as the X-1, it was developed by a team led by Dr. Max Cramer
from BUG.

Structurally, the EX 1400 was an armor-piercing bomb RS 1400 weighing 1400 kg,
equipped with cruciform bearing planes in the middle part of the body and
ring-shaped tail with control surfaces, the warhead contained a charge
amatola. Specially equipped
bombers Po 217 or He 177. The bomb was usually dropped from a height of 6 thousand meters,
its flight range was about 2.5 km. It was controlled using the Kehi bigavvbigr radio system, the
operator tracked the course by a beacon in the tail of the bomb. Tests of experienced
bomb designs began in 1942.

Planning bombs were used most intensively

“
strongly in the Mediterranean. After Italy signed an armistice on September 8, 1943 with
allies, the Italian fleet left its bases on the mainland, heading for Malta, where it
had to surrender to the allies. With a view to dezin

formation, the Italians informed the Germans that this fleet was going to sea in order to assist
Kriegsmarine in the fight against the allies. However, the Germans were on their guard, and Luftwaffe aircraft
shadow followed the Italian ships.

The next day, when the fleet had just passed between Corsica and Sardinia, he
attacked by 11 Po 217 bombers carrying Etig-X glide bombs.
The bombers concentrated their efforts on attacking the battleships Kota and Nana. Kota received
two hits that caused fires on the lower decks. Twenty minutes after the first
On impact, the fires reached the artillery cellars of the battleship, after which an explosion
thundered, breaking the ship into two halves. The ship sank with most of the crew. To the battleship Tzaja

only one Yeni-X bomb hit, but although the damaged ship took on a lot of water, it still managed to reach Malta.

After the Allies landed at Salerno, Luftwaffe bombers attacked the Allied ships with glide bombs for a week. As a result of these attacks, the battleship Vuagvriye (England), the cruisers Orapda (England) and Zauaplav (USA) were badly damaged, and several small ships were sunk or damaged. In \ UageRie hit three bombs Egig? -X, one of which pierced six decks and exploded, forming a large hole in the bottom of the ship. The ship took on a lot of water and was completely damaged, but there were no fires, and the losses among the crew amounted to 9 killed and 14 wounded. The battleship was towed to the base, where it was repaired until the early summer of 1944 -

Approximately 66 bombs were produced each month, much less than planned, and approximately half of them were used in tests carried out during 1943-1944. In early 1945, the Yetit X program was terminated, however, this was not due to production difficulties, but to a high percentage of losses among carrier bombers.

Characteristics of Rtig-X: span of planes - 1.49 m;. length - 3.26 m; maximum hull diameter - 0.562 m; bomb weight - 1650 kg; combat charge weight - 320 kg; maximum speed — 1035 km/h.

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nuk ÿ s

In August 1943, the AES and AChas firms developed a remote-controlled aircraft torpedo MUK. Tests of the torpedo were carried out at TUA (Gotenhafen) under the direction of Dr. Aschoff, the torpedo was controlled by wires. According to the test results, the torpedo was recommended for production, however, Kÿ.M specialists considered that it would be difficult and unreliable in operation, therefore, further work
refused.

at 1000 about

: The ET 1000 torpedo was developed in 1942 by Blom and Voss. A two-stage turbine with a capacity of 500 liters was used as a power plant. s., designed by BM\. Initially, two components were used as fuel - concentrated sulfuric acid and sea water. Later, a combination of Topka and nitric acid was used, which allowed the torpedo to reach speeds in the water of about 40 knots. In order to increase the range of the torpedo, VMU/ soon developed for it a project of the R.3381 rocket engine capable of developing a thrust of 500 kgf for 50 s.

The torpedo had a flattened hull shape, the so-called EvsiYuyugt (“Fish shape”), in the tail part of the hull there was a double keel and a stabilizer. End washers were installed at the ends of the stabilizer with a sweep of 45. In the spring of 1942, prototypes of the PT 1000a torpedo were first built, having a length of 5 m and a maximum diameter of 0.53 m, and then samples of the IT 10005 of increased dimensions. With a length of 5.4 m, the ET 10006 torpedo had a stabilizer with a span of 1 mm. The warhead was long

And 10005 231

„35 m, 0.46 m wide and 0.8 mm high. In the middle part of the hull there were tanks with ZaShe!, Top-Ka components, with coolant and compressed air. The turbine, located in the rear part of the hull, set in motion two counter-rotating propellers with a diameter of 0.4 mm. In January 1944, prototypes were tested.

C 1200

In 1943, prototypes of the IT 1200 torpedo with a rocket engine were built, the samples were produced in two versions. The engine for the torpedo was developed by NUK (“Walter”), T5-5kog (TavoNp), V-5(o!g (hydrazine hydrate) and additive 7th (sodium or calcium permanganate) were used as fuel components. tests were carried out at the G.EA Institute, the torpedo was not put into mass production.

Characteristics of TT 1200A: length - 5.2 m; the maximum diameter is 0.45 m; weight - 815 kg; fuel weight - 453 kg (15-5th - 378 kg, V-5yu - 47 kg and 2nd - 28 kg); maximum thrust engines - 800 kgf; engine operation time — 106 s; speed in water - 40 knots; range — 2.2 km.

Characteristics of GT 12008: length - 7 m; maximum diameter - 0.533 m; weight - 1200 kg; fuel weight - 330 kg (TV-byoy - 280 kg, V-Zuy - 32 kg and 7-ZuY - 18 kg); maximum engine thrust - 760 kgf; engine operation time — 106 s; speed in water - 35 knots; range — 5 km.

11 1500 V !

The PG 1500 torpedo developed by the IPA was equipped with a rocket engine manufactured by NUK and SRUA (Chemical Physics Institute). The control system was developed by TN (Aachen). A

Characteristics of GT 1500: length - 7.05 m; maximum diameter - 0.533 m; weight - 1520 kg; fuel weight - 448 kg (Tz-Syu0Ya - 379 kg, Oekaip - 45 kg 27-5101 - 24 kg), weight -boesarid - 682 kg.

19. SPINING BOMB -

On the night of May 17, 1943, 19 British bombers took off from Scampton Air Base (England), their target was five dams located between Dortmund and Kassel. The bombers carried bombs designed by Dr. Wallis of McQueen Argyle.

^ A bomb weighing 3900 kg, of which 2800 kg was explosive, was a cylinder 1.57 m high and 1.27 m in diameter. min, after which it was dropped from a height of 18 m at a speed of 370 km/h. After being dropped, the bomb “jumped” along the surface of the ox for some time, jumping over anti-torpedo nets, after which, losing speed, it dived into the water and exploded at a depth of 9 m. As a result, two dams were destroyed and more than 1000 Germans were killed, although the British lost when flying 8 of their aircraft.

This raid forced KI.M to begin intensive tests

bombs of a similar design in order to use them not on coastal , only against dams, bridges and fortifications, but also; against large enemy ships. Professor Wagner developed a project for a 600-kg rotating bomb, shaped like two truncated bombs put together. electric motor before the reset, was developed at the Aviation Technical Institute

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EV (Eshriesÿpÿÿsÿep ani deg TN). The KoPeg bomb, developed at UG, was tested from a catapult at the Heinitzsee reservoir near Berlin.

Mate

The anti-ship bomb Ma!ge ("Cylinder", "Val") was a cylinder, for the OSB of which a bracket with a solid-propellant rocket engine was attached. Preliminarily spun up to 1000 rpm, Magre was dropped from the aircraft at a low altitude. After reset

The rocket engine turned on the bomb, which made it fly about 700 m above the water, after which, having gone into the water, the bomb exploded at a given depth.

Characteristics Mae: total weight of the bomb - 90 kg; cylinder weight - 40 kg; combat charge weight - 30 kg; engine operation time — 0.7 sec.; range - 800 m.

Rgÿztelÿotÿe

In response to the requirement of KIM to simplify the design of rotating bombs and increase their range with a greater weight of the bomber, the development of the Pivisiv bomb without an engine began. The first tests of the model showed, however, insufficient lateral stability of the bomb. An improved model in the form of a prism with 24 faces was developed in OM1, in September 1943, and received the name Riztepbotye.

The propellant weighing 1500 kg was capable of delivering 800-900 kg of explosives to the attacked ship, covering a distance of 1015 m in 10 s. A standard ET torpedo, carrying approximately 200 kg of explosives, covered such a distance in 50 s, which gave the enemy ship the opportunity to evade it. Tests took place on two versions of a 1500-kg bomb and one version of a 3000-kg bomb. As a result of the tests, it turned out that prisms with 24 or even 30 faces did not have a special advantage over a conventional cylinder. Nevertheless, when dropped from an aircraft at a speed of 650 km/h, one of the bombs covered a distance of 5500 m in 24 seconds. This far exceeded the performance of the ET torpedo.

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However, military trials showed that the Punchline was a "weapon of fine weather," since a slight wave at sea had an unfavorable effect on the lateral stability of the bomb and increased the number of misses by 30-50%. In total, a small batch of bombs was released, mass production did not begin.

star 800 In the fall of 1943, work began on a spherical bomb at the Travemünde test center. After the development of the project under the direction of Dr. Lambrich in the department of the MKT. The Rheinmetall-Borsig company began manufacturing a pilot series. It was a bomb called ZV 800 K5 Kip, composed of two steel hemispheres weighing 150 kg each and filled with 300 kg of explosive. Deep fuses were provided as fuses. fuse U \ / azzegaskgop4eg 44 and two fuses 77. 59 with a delay of 23 s. A box-shaped tail section with four cruciform aerodynamic surfaces inside was attached to the sphere through a cylindrical spacer. The spacer housed a Lorenz gyroscope weighing 3.8 kg and 0.14 m in diameter; Nervous initial tests of this version of the bomb with a drop at a speed of 700 km/h from a height of 20 m showed that the range of the bomb moving under water does not exceed 400 m. 0.42 m. This is how the final version of the 5V 800 K5 bomb worked. At a carrier aircraft flight speed of 550 km/h, the bomb was dropped from a height of 20 m, after about 0.4 s the powder charge in the gyroscope ignited, after another 0.3 s the gyroscope spun up to 12 thousand rpm, stabilizing the movement of the bomb . By this time, the rocket engine was turned on and accelerated the bomb to a speed of about - 300 m / s in 2.8 s. After the engine charge burned out, the empty rocket engine was fired from the sphere along with it. Further, the sphere flew about 2000 m in a tail-glide flight and with a residual speed of about

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220 m / s entered the water, continuing to move towards the target. The explosive charge was detonated with the help of a deep fuse or self-liquidator E127 49. About 560 such bombs were produced, trial tests were carried out from E 190, Ji 88 and Me 410 aircraft at the Pomerania training ground. In August 1944, work on the project was terminated. A

Characteristics 5V 800 V5 Kin: length - 1.9 m; the diameter of the sphere is 0.75 m, the total weight of the bomb is 780 kg, the weight of the sphere is 450 kg; combat charge weight - 300 kg, engine thrust - 7000 kgf, engine operation time - 2.8 s, range - 2500 m (estimated) and 4500 m (actually achieved).

Cog?-2

The Rheinmetall-Borsig firm in the spring of 1944 developed a project for a more powerful Kigi-2 bomb. The warhead of the bomb had a cone-shaped tip 0.76 m long. In the middle, cylindrical part of the body, there was a gyroscope and a device for shooting the tail. A spring with a compression force of 1000 kg was used as one of the options for the ejection device. The tail of the bomb housed a rocket engine and an aerodynamic . plumage, which was made of plywood 7.5 mm thick. Prototypes of the bomb were blown through the aerodynamic tube of the AUA Institute.

Characteristics of Kshÿ-2: length - 2.28 m; warhead length — 1.1 m; the maximum diameter of the warhead is 0.75 m; plumage span - 1.22 m.

20. Gliders

Vu 40 i At the beginning of 1943, Blom and Foss developed a project for a fighter glider designed to fight Allied bombers. It was assumed that a glider diving from a great height and armed with 30-mm cannons would be able to approach the enemy unnoticed and attack him. Ya The glider had a wooden structure, except for a cockpit welded from steel sheets, in which the pilot was lying down. The take-off was carried out with the help of a towing aircraft on a two-wheeled trolley that was dropped; a ventral ski was used for landing. First on

years Wu 40% 1 took place at the end of May 1944 with the BE 110 tug.

At the beginning of the summer of 1944, KIM changed the technical requirements for the VU 40, which required further design. It was proposed to convert the airframe into a mini-plane with a rocket or pulse engine, as well as to install hardpoints for four 70-kg bombs under the wing. 19 experimental test vehicles were ordered, and an order was being prepared for an installation series of 200 aircraft. However, already in the autumn of the same year, the program was closed, although they were built. 9 cars.

- Characteristics of Wu 40: wingspan - 7.9 m, area - 8.4 m ?; length - 5.7 m; height - 1.6 m; empty weight - 840 kg; takeoff weight - 950 kg; maximum dive speed — 900 km/h; armament - two guns MK 108.

It was . The glider OE8 230 was first demonstrated to the highest military leadership in 055 230 1937. intended to carry 8 people, it was taken off in tow behind a Ti 52/3t aircraft. The towing aircraft could simultaneously tow up to six YuES 230 gliders.

With the help of BE5 230 gliders, German paratroopers carried out one of the most unusual operations of the Second World War. At 5:20 am on May 10, 1940. 11 BE5 230A-1 gliders landed on the roof of Fort Eben-Emael in Belgium and landed a sabotage group "Granit" consisting of 85 people. As a result of this operation, a day later, the fort was captured by approaching German troops. However, the largest operation involving OE $ 230 was the operation to capture the island of Crete a year later, the number of simultaneously involved planes

`ditch amounted to 53 copies. On the other hand, the loss of gliders was such that operations of this type were never undertaken by the Germans again.

Under normal conditions, a 40 m long cable was used to tow the PEZ 230, while a rigid hitch was used at night or in bad weather. In 1942 it was proposed

use the glider as part of the so-called Mistel scheme, while the towing aircraft

drank on the back of the glider. Initially, a Klemm KI 35V light aircraft was used as a towing vehicle. The Mistel was lifted into the air in tow behind a Ti 52 aircraft, after which it was uncoupled. The engine power of the KI 35V aircraft was sufficient for the further flight of the coupler. Then in a series of tests as a letter

` aircraft used Eu 56`and BE 109. Is

The tests were successful, they demonstrated the ability of the bunch to take off independently due to the operation of the engine. fighter.

The REZ 230A gliders were in service with the airborne squadrons 1161 and 1.62, as well as separate glider squadrons. Usually they were used to supply German groups that were surrounded. So, for example, in January 1943, gliders from the squadron N.S! operated from the Kerch Peninsula, supplying German troops in the Kuban. From January to October the glider squadrons suffered heavy losses, especially during the winter months. -

The OE$ 230V-1 version was similar to the OE5 230A-! version, but had a braking parachute and defensive armament: nie. These gliders were used in North Africa, but the most famous operation with their participation was to rescue Mussolini, who was under arrest at the Rifugio Hotel (Abruzzo). To free the Italian dictatorship

. ra on 12 planes BE5 230S-1 (this designation received

or gliders with three braking rocket engines in the bow), a team of Hauptsturmführer Otto Skorzeny was delivered, which included paratroopers from the parachute training battalion and 40 people from the special

: Noah SS team. As a result of Mussolini's operation,

released, and he was taken out on an Ei 156 plane, accompanied by Skorienya. A later version of the OEZ 230E-1 could carry 15 people. At the beginning of 1945, the Luftwaffe had

° there are five glider squadrons in its composition, but by April 25

for their number has been reduced to three. In total, more than 1,500 copies of the BE5 230 were produced during the war years.

Characteristics WITHOUT 230A-1: wingspan - 20.87 m, area - 41.3 m³; length - 11.24 m; height - 2.74 m; empty weight - 860 kg; takeoff weight - 2100 kg; maximum speed when towing - 210 km / h.

cut 331

The BE5 331 wide-body glider was developed under the guidance of H. Jacobs, the author of the OE$ 230 glider, which was widely used during the war years. The forward part of the fuselage was glazed, the pilot's canopy was located on the left. The MC 15 machine gun was to be placed in the bow. The glider took off on a drop two-wheeled cart, landing was carried out using skis. The only copy of the airframe was built by Gotha in 1941, after which all work on the GEZ 331 was curtailed.

Characteristics of BE5 331: wingspan - 23 m, area - 58.0 m2; length - 15.8 m; height - 3.55 m; empty weight - 2270 kg; maximum takeoff weight - 4775 kg; maximum speed when planning - 330 km / h.

- bo 242

In 1940, the Gotha company, under the leadership of Albert Kalkert, developed a two-beam transport glider under the designation Co 242. howling upholstery. In the rear fuselage there was a hatch through which the machine was loaded. The crew consisted of 2 people, 21 paratroopers could be placed in the cargo compartment. The chassis consisted of three skis. During takeoff, the nose ski was retracted, the takeoff run was carried out on a dropped two-wheeled cart. The first two prototypes were tested in the spring of 1941.

Gliders of the A series (cargo So 242A-1 and landing So 242A-2) were armed with four MO 15 machine guns - one in the wing, one in the rear of the fuselage and two in the side windows. The first gliders entered service in August 1941, and soon six glider squadrons with Co 242A were formed. Until the end of 1941, the Luftwaffe received more than 250 gliders, on the basis of which six glider squadrons were formed. So 242 gliders took part in combat operations as early as the beginning of 1942,

supplying the Kholmsk cauldron. In the summer of the same year, K.Og.g.r.U5 and K.Sg.2.6.U30 received So 242 for operations as part of the 4th air fleet in the southern sector of the Eastern Front. A separate squadron "Don" consisted entirely of So 242, He 111 bombers were used as glider towing aircraft. skis. Gliders So 242V-1 and So 242V-2 were cargo, and So 242V-3 and So 242V-4 were parachute

gliders with additional Co 242s supplied the 1st doors in the tail section. In the spring of 1944, landing Tank Army, surrounded at Kamenetz-Podolsk, and then were transferred to the Crimea. Some of the gliders were converted to transport the wounded, and some were converted into mobile workshops and operating rooms for use at advanced airfields.

In 1944, another version was launched into the series - Co 242C-1, adapted for landing on water. This option was proposed to be used to attack the English fleet in Scapa Flow by Italian man-controlled

mi torpedoes 51.S. The glider fuselage had the shape of a boat, air bags were installed inside the hull to increase buoyancy, and there were stabilizing floats under the wing. The glider took off behind a tugboat on a dropped two-wheeled cart, it had to carry one 51.C torpedo and its crew of two people. Having waved near the naval base of Scapa Flow, the gliders had to unload torpedoes with their crews, whose task was to penetrate the harbor and carry out sabotage attacks on the ships stationed there. However. the planned operation did not take place. {

The total production of Co 242 gliders during the war years amounted to more than 1,500 copies, of which 133 were converted into Co 244 - a version of a glider with two engines.

Characteristics of So 242A-1: wingspan - 24.5 m, area - 62.4 m2; length - 15.8 m; height - 4.25 m; empty weight - 3200 kg; maximum takeoff weight - 7300 kt; maximum speed when planning - 290 km / h.

bo 345

The project was developed in 1944 in two versions - So 345A for transporting eight paratroopers and cargo So 345B, the airframe crew consisted of two people. So 345A had a semi-retractable landing ski, takeoff was carried out on a dumped wheeled cart. To reduce the length of the run when landing in. the forward part of the fuselage provided for brake rockets. For the speed of landing, both sides of the fuselage had two large doors that opened upwards. It was possible to install two Av 014 scramjet engines under the wing, which were supposed to provide the possibility of independent flight after uncoupling from the tug. So 345B did not have side doors, for access to the cargo compartment the forward fuselage along with. the cabin opened up. A prototype Co 345B was tested in the summer of 1944 in Rechlin, and Co 345A was made only in a layout.

Characteristics Co 345A; wingspan - 21 m, area - 48.3 m'; airframe length - 13 m; height - 4.2 m; empty weight - 2470 kg; takeoff weight - 4100 kg; maximum speed when planning - 370 km / h.

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Ka 430 E In 1943, the project of an airborne glider under the designation Ka 430 (named after the company's technical director Albert Kalkert) was completed. Cargo from-: the fuselage section ended with a ramp through which it was possible to load large objects. In the forward part of the fuselage, a battery of brake rockets was provided for the possibility of landing on platforms of limited size. The floor of to provide the cockpit for protection against small arms fire was made of an armored plate 13 mm thick. Above the cabin there was a tower

+ with a MO 131 machine gun. According to the test results of an experimental

: cars were ordered 30 pre-production Ka 430A-0 company: Mitteldeutsche Metalwerk in Erfurt. The first of the pre-production machines was completed at the end of 1944, but before the end. war managed to build only 12 gliders. : Characteristics of Ka 430-0: wingspan - 19.5 m, area - + area - 38.7 m2; airframe length - 13.2 m; height - 4.2 m; empty weight - 1810 kg; takeoff weight - 4600 kg; maximum towing speed - 300 km/h; maximum gliding speed - 320 km/h; armament - 1 machine gun MS 131 ..

Me 321 As part of preparations for the invasion of England, the firm * "Messerschmitt" developed in 1940 a giant glider: Me 321 for transporting armored vehicles and units de-; santnikov. The machine was made entirely of wood, the loading of the fuselage was carried out through the nose section that folded up. The takeoff of the glider was to be carried out on a drop cart, landing - on skis. : The glider was lifted into the air by a tug He 1117 or: a trio of BE 110 aircraft. To facilitate the take-off of gliders with accelerators. often equipped with starting

The first flight took place in March 1941, the serial gliders Me 321A and Me 3218, which had a wheeled chassis, entered service in June of the same year in specially formed squadrons of heavy gliders that operated on the Eastern Front - in the Baltic States, Belarus and Ukraine. Me 321 supplied

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German aviation and ground forces, transport ammunition, fuel and personnel. The experience of operating gliders has shown that the supply of advanced units requires the use of transport vehicles capable of independently taking off. Therefore, it was proposed to consider the possibility of equipping - Me 321 engines.

The order for the construction of 200 airframes was completed at the beginning of 1942. At the same time, Me 321s began to be withdrawn from the Eastern Front in the Mediterranean to prepare for a landing on Malta. In this operation, the Me 321, together with the He 1117 tugs, were supposed to deliver heavy equipment and ground forces to the island, but the operation did not take place. In 1943 part. Me 321 gliders

was used from the airfields of the Crimea to supply German troops in the Kuban. Remaining
the gliders were transferred to France, where they were being prepared for the transfer of parachute divisions to Sicily, but
the operation was cancelled.

Characteristics Me 3218-1: crew - | Human; wingspan - 55 m, area - 300.0 m "; length
- 28.2 m; height — 10.2 m; puet weight - 12,400 kg; maximum takeoff weight — 39,500 kg;
maximum speed - 160 km / h; planning speed - 140 km / h; armament - two machine guns MS 15.

i 322 :

In 1941, Junkers was awarded a contract to build 200 Lee 322 landing gliders.
Matini ("Mammoth"). The glider ÿi 322, made entirely of wood, was intended for
the same goals as the Me 321. During ground tests of the first prototype airframe
Trouble began - when trying to load a light tank into the fuselage, the floor was broken in
cargo compartment. The design of the cargo compartment was strengthened, but at the same time, the carrying capacity
airframe has decreased by 20% compared to the calculated carrying capacity. However, trouble
didn't end there. During the first flight test, the tug ÿi 90 managed to lift
glider into the air only at the very end of the runway. Dropped after takeoff
the glider's cart shattered on the ground.

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: In addition, the glider, which had taken off from the ground, began to pull the tug down. glider pilot in
in an emergency, dropped the tow rope, and the glider, not having time to gain altitude, made
forced landing in the field. Two weeks later he was towed back to the airfield.
the same , tanks that were supposed to be transported on a glider. The project was canceled, and 98 already
mounted gliders were firewood. m; length - 30.25 m; height - Characteristics ÿi 322: wingspan - 62.0
10 m; empty weight - 26 thousand kg; maximum - 36 thousand kg. , take-off weight —

Light gliders < The Luftwaffe was armed with large coli-gliders developed on the instructions “ lung capacity
of K.M by aviation groups, flight schools and
separate - designers. These gliders were used for various purposes: initial
pilot training, performance of: sabotage missions, training of pilots of missile aircraft Me 163 and Ba 349, flight tests ,
of units and control systems of advanced
aircraft, etc. A large number of various gliders were being prepared in 1940 to participate in
of the planned Operation Seeome (“Sea Lion”) against England. The following is far from
complete list of light gliders.

Glider Developer m m weight, k | niya, km/h "AEV 4 Eppman

and Vollmer 15.0 | 6.5 | 1.82 | 270 ED IN 5 EEC, Berlin | 15.0 | 6.15 { 1.24 | 225 76 Wb EEC, Berlin |
16.0 | 6.2 | 1.25 | 240 68 va EPO, Berlin | 15.0 | 7.1 | 15 |260 68 si ghas, Chemnitz! 16.0 | 6.3 | 1.5 |280 72
Sopdog IT H. Dietgmar 17.24| 7.6 | 1.9 325 75 PE -Eaÿÿg P | A. Lippisch 19.0 | 7.91 | 1.81 | 350 75 PES Nabis | H.
Jacobs 13.6 | 6.35| 2.05 | 290 - ReE$ÿ-Kgapÿsÿ | H. Jacobs 180 | 7.7 | 24 | 435 70 RE$-Otry | X.
Jacobs 15.0 | 7.27[1.6 | 255 69

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RUA 9 EMA 105 EUA AND E5 16

E5 18a

Otipai 7 bo | Co 3 Co 4

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Koÿygÿ-V Mi 10

Mo 13

Mi 134

Mi 17 Kÿopafeg Knopfizvag v2

586 38

21. HUMAN TORPEDOES

The story of German man-guided torpedoes is one of those desperate attempts to change the course of the war. These devices were intended for the defense of coastlines and were supposed to withstand the forces of the Allies when they landed on the coast of France, Italy, and also in Scandinavia. at

The first work in the field of creating sabotage underwater vehicles was started in Italy during the First World War. The man-controlled torpedo "Minyatta" (Mjelatsa - leech), built in two copies in Venepia in the spring and summer of 1918, was the brainchild of Major R. Rossetti. "Minyatta" with a length of 7.2 m and a diameter of 0.6 m weighed about one and a half tons. The torpedo engine ran on compressed air and drove two low-speed propellers of small diameter. Compressed air at a pressure of 205 atmospheres was stored in a tank located in the middle part of the torpedo; this air supply allowed the torpedo to cover a distance of up to 10 miles at a speed of 2 knots. The torpedo carried two cylindrical mines, each of which contained 175 kg of explosive and clockwork with a maximum delay of up to 6 hours. Two swimmers, dressed in specially designed wetsuits, were located one after the other in the seats on the central compartment of the apparatus. The torpedo had no rudders, so in order to change the direction of the vehicle, the crew members had to work their arms and legs like oars. The only control mechanism was a valve for regulating the supply of compressed air from the reservoir to the engine. Swimmers could swim sitting, one after the other, but in this configuration, while moving, the rear

swimmer

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was up to his neck in water. For this reason, swimmers preferred to swim from both sides: torpedoes, holding on to special handles mounted on the central part of the hull. The mines, which had zero buoyancy, were attached with the help of magnets built into them to the hull of the attacked ship.

The first combat use of the Minyatta took place against the Austrian battleship Viribus Unitis. The torpedo crew consisting of R. Paolucci and R. Rossetti managed to mine and sink the battleship. The Italians returned to the concept of a man-guided torpedo before the start of World War II. Two junior lieutenants Teseo Tezvi and Elios Toschi, who served at the naval base in La Spezia, in October 1935 began the development of a new submersible 51 / C (Sciorgi 1 ema Corza - small hole torpedo), which later received the nickname "Mayale" (Maiaie - pig). The development of Mayale was based on an electric torpedo of 533 mm caliber. Structurally, the device consisted of five sections: a warhead, a front section with a command control panel, a central section with batteries, a rear section with

electric motor and tail section with propellers, rudder and depth rudder. With the use of Mayale submersibles, combat swimmers of the 10th Flotilla of the IAS carried out a number of successful sabotage operations, the most famous of which are the attacks of British ships in the bay of Gibraltar in September 1941 and Alexandria in December 1941.

In 1942, the British Navy began developing its own

. torpedo, which received the name ÿÿÿÿÿÿÿ (“Chariot”), and soon the 12th submarine flotilla was formed. The Sgagio torpedoes were almost an exact copy of the Italian Mayale torpedoes and differed from them only in "minor details.

In February 1943, Vice Admiral Helmut Heie developed a plan to create small units of the KKU (Keshkatrefapae) as part of the Kriegsmarine to carry out individual special operations. These units were to include combat swimmers, human-guided torpedoes, midget submarines, exploding motor boats, etc. One of the leaders in this
But-

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the young captain-lieutenant Bartels - became the first direction; former commander of the minesweeper M1 and commander of a hundred-. rye flotilla (WatroviepJob She), created by the Germans in Norway. Under his leadership, a powerful coastal defense system was created within a few months. Even then, he was working on the idea of using ultra-small submersibles for these purposes. In 1942, Bartels submitted a memorandum to the command on this issue, which stated that Germany needed a large number of such small-sized devices in order to

“protect thousands of miles of Reich coastline. By the beginning of 1943, Bartels had received the rank of corvette captain, and he was entrusted with the creation of the KKU service. Under his leadership, the development of the ultra-small submarine Vizher and man-controlled torpedoes "Marder" and "Neger" (Medeg - Negro) began.

"Neger" (Medeg - Negro)

The Germans used the Italian experience by creating their own human-controlled torpedo, called the Neger. The Negr torpedo was developed under the guidance of naval engineer Richard Mohr from the TUA (Togredouegvpsÿvapäan) torpedo testing center in Eckernförl. This

- the device consisted of two C7e torpedoes mounted on top of each other. Half of the batteries and warhead were removed from the upper torpedo, this allowed the driver's cabin to be installed and sufficient buoyancy to carry a second torpedo. The cabin of the device was closed from above with a plexiglass cap, through which the driver aimed his device using the marks on the windshield (the so-called Kitte-Korp-Verier). The device could not dive, but moved in a semi-submerged state. The cabin was equipped with extremely simple controls, consisting of

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compass, control stick and two levers to turn on the electric motor and reset the torpedo. While in the cockpit, the driver used the Ogaweg breathing mask with carbon dioxide absorber used in the Luftwaffe. For breathing, compressed air was used, which was stored inside a 30-liter cylinder. During the attack, the device was supposed to approach the target at a distance of no more than 300-400 m and fire the lower torpedo. After that, the device turned around and left the battlefield under its own power. Since, with this method of attack, the driver's chances of survival did not exceed 50%, the personnel of the Negers units were recruited only by volunteers. Approximately 200 apparatuses were built in 1944.

The first devices were delivered in March 1944 to the armament of the 361st, 362nd and 363rd small fleets (K NonShe) from the Gegkottapdo 350. And already on the night of April 20, 30 Negers took part in the hostilities near Torre Vayanica, north of the Allied bridgehead at their landing at Anzio. Failures began to haunt the Germans already during the descent of the apparatus into the water. Heavy torpedoes were manually dragged to the water along a sand beret, while 13 apnarats whined and had to be abandoned. Of the 17 launch vehicles, eight went off course, and nine reached the given area did not find a single large target, so the attack did not take place: As a result of this operation, three Negers were lost, one of them was found by the Allies on the next day. The torpedo floated on the surface, and its pilot was dead due to carbon dioxide poisoning.

The second sortie of the Negers took place on the night of July 5-6, 1944, when 26 vehicles headed from Villers-sur-Mer (Normandy) to the port of Caen, on the outer roadstead of which stood British ships under the command of Rear Admiral Raivett-Karnak. These ships bombarded the coast, supporting the actions of the British ground forces that stormed the city of Caen. Shortly after going to sea, two Negers sank, their drivers swimming back to shore. The remaining 24 vehicles managed to reach the anchorage of the British ships. It turned out that large enemy ships, among which were one battleship and four cruisers, were under cover of many small escort ships, and

it was impossible to get through to them. Therefore, the Germans attacked those ships that were in the perimeter of the guard. As a result, they sank the trawlers Sao, Mars and several small transport ships. Only 9 Negers returned to base. A second attack took place on the night of July 7-8 with the participation of 21 vehicles, but on a clear and moonlit night all the vehicles were discovered and sunk by aircraft or patrol ships of the British. As a result of this attack, the Germans managed to sink the minesweeper Ruyaev and damage the Polish cruiser Yugarop. After the attack, not a single device returned to base. Characteristics of "Neger": length - 8 m; diameter - 0.533 m; displacement - 2.7 tons; power plant - E10-EM torpedo electric motor with a power of 12 liters. s., maximum speed - 4.2 knots on the surface and 3.2 knots submerged, cruising range - 48 miles.

"Marder" (Magdeg) "Marder" ("Marten") was a more advanced version of the German human-controlled torpedo. Unlike its predecessor, the Neger, the Marder was equipped with a 30-liter ballast tank and a transfer pump, it was able to dive to a depth of 40 m, but had a very limited submerged autonomy. In total, about 300 devices were built. E In July 1944, the first Marder vehicles entered service with the 364th, 365th and 366th Genkottal small fleets - up to 350. The first attack involving the Marders took place at night from 2 to 3 August 1944 against the Allied fleet. The Germans managed to sunk the 7219-ton ship I4ÿetÿu, the mine sweeper and the 907-ton destroyer Enot. In addition, they damaged an old cruiser, planned by the Allies to be sunk as a breakwater, and

7000 ton transport. Of the 58 Marders involved in the attack, only 17 returned to the base, the rest were destroyed as a result of the Allied counterattack.

The last attack in Normandy took place on the night of August 16-17, when 42 vehicles attacked the 23,189-ton French battleship Soshfey, which was standing off the coast (in fact, the ship was of no value to the Allies, since all equipment was dismantled from it), Two "Mar - Dera" torpedoed the battleship, and the rest managed to sink two small ships, the 757-ton balloon-trapping ship Egatsop and the 415-ton landing craft. As a result of the attack, 26 out of 42 vehicles were lost, one was captured by an EU$251 support vessel after its driver was destroyed by shelling.

To increase the range of human-controlled torpedoes, it was planned to adapt Type UPS submarines as carriers of the Marders. For example, a submarine ÿ 997

was modified to install 4 "Marders" on her deck, which were supposed to be used for sabotage purposes in the Murmansk region. Tests of the weapons in Norway were carried out in January-April 1944, but the final order for an attack on Murmansk was never issued.

In early September 1944, 30 Marders attacked allied ships twice, but were unsuccessful, 14 were lost at sea during these attacks, and the rest were destroyed by allied bombers at a German base on 10 September. After that, the command of the Kriegsmarine decided to stop military operations with the Marders.

Characteristics of "Marder": length - 8.3 m; diameter - 0.533 m; displacement - 3.0 tons; power plant — torpedo electric motor Eco-EM, power 12 l, s.; maximum speed - 4.2 knots on the surface and 3.2 knots submerged; cruising range - 48 miles.

On 2

The insignificant power reserve of the Neter and Marder torpedoes led to the emergence of a new device with an increased power reserve called Naj (“Shark”), the prototype of which was developed at the TUA in Eckernförl in 1944. It

consisted of two torpedoes docked along the length and had double the capacity of the electric battery. An AEO-AU 76 electric motor with a power of 12 liters was used as a power plant. With. It was expected that this upgrade would increase the speed and range. As a weapon, the apparatus could carry | torpedo or 1 minute.

Contrary to expectations, testing of the prototype revealed a number of shortcomings, among which were: poor seaworthiness and maneuverability of the apparatus, which was a consequence of its great length, the impossibility for the driver to open the cockpit hood from the inside in an emergency, etc. After testing the prototype` all further work on the apparatus was stopped.

Characteristics Naj: length - 10.8 m; diameter - 0.533 m; displacement - 3.5 tons; speed - 4.2 knots above water and 3.2 knots under water; power reserve - 63 miles at 3 knots; crew — 1 person.

22. SUPER SMALL SUBMARINES.

In 1933, the General Staff of the Japanese Navy adopted the concept of an attack by ultra-small submarines (SMIL) of enemy bases and anchorages. In accordance with this concept, Captain Kishimoto Kaneji designed a midget submarine equipped with two torpedoes. Such boats had to be delivered to the place of the operation by specialized ships or large submarines. Nod under the veil of the strictest secrecy in 1934, two experimental SMPLs were built at the shipyard of the Navy in Kure. Tests of these devices led to: the creation of a later version, which appeared in official documents as a “target boat” (A-NuoYu). Two boats under the designations HA.1 and HA.2 were built in 1936, according to the test results, the project was finalized, after which it was decided to start serial construction of more advanced SMPLs under the designation Ko-Nuogen. The SMPL building program itself, carried out in an atmosphere of extreme secrecy, began in earnest in 1938 with the construction of 49 boats (from HA.3 to HA.52). As carrier ships, the air transports Sshoda and Srchose, as well as submarines of the He!-Sma type, were re-equipped.

The first combat use of Japanese SMPLs took place during the attack on the American naval base at Pearl Harbor, although four boats out of five participating in the attack were sunk. The second major attack was the attack on Sydney Harbor in May 1942, during which a heavy

USS Chicago. The attack on the British forces off Madagascar was more successful, as two Japanese SMPLs damaged the battleship Capez and a tanker.

Nevertheless, the results of the combat use of Japanese SMPLs did not make much of an impression on the Kriegsmarine command. At the beginning of World War II, it saw in these boats only a waste of material and human resources. Projects for the construction of SMPLs were rejected for a long time in the Kriegsmarine, since it was believed that the conventional submarines that were in service, in particular the boats of the YH series, could successfully perform all these functions. And this was supported by facts; For example, on the night of October 13, 1939, the German boat ÿ 47 under the command of Lieutenant Commander G. Prien entered the harbor of the English naval base Scapa Flow and sank the battleship Kowa! Oak with 833 crew members.

However, the successful attack of three English SMPLs

. 05, X6 and X7) on the German battleship Tirpitz, which was stationed in Altenfjord (Norway), forced the Kriegsmarine command to take a fresh look at the effectiveness of this weapon. On the night of September 22, 1943, boats X5, X6 and X7 managed to slip behind the old cargo ship through a series of barrier nets and reach the anchorage of the battleship Tirpitz. Security, finding one of the devices, raised the alarm and sank it (it was the X5 boat). But the X6 boat managed to climb under a huge ship and drop both mines, after which she got entangled in underwater nets and was forced to surrender. The X7 boat also dropped two mines under the Tirpitz, but before she could get to a safe distance, the first of the X6 mines exploded, damaging X7 as well, after which the boat was also forced to surrender. The attack on the Tirpitz was a huge success for the British, although the mines dropped by the boats did not sink the battleship, the damage they caused made it necessary to tow it south for repairs. The Tirpitz was finally within range of the British bombers, who bombed it a year later.

The success of the British forced the command of the Kriegsmarine to organize the so-called K-flotillas as part of the small units of the KeshkatrG- " `uefapaye, which were urgently armed with SMPLs developed not

German designers. These weapons were first used by the Germans in 1944, in an attempt to prevent the landing of allied forces in France and Italy.

bieber

On November 22, 1943, during an attack on a German base in Bergen (Norway), the English SMPL YYeitap \46 was captured. Immediately after that, on the initiative of Bartels, the development of the German SMPL "Bieber" (Bfeg - beaver) began. In January 1944, Bartels began negotiations with the Nepdehuecke firm in Lübeck to build an apparatus. The development of the design of the prototype, known as Wipe-Vo or "Adat", took only six weeks and was completed by 15 March. The tests of the device were carried out under the leadership of Bartels on the Trave River, and on March 29 the device was put into operation. An experimental series of 24 boats was ordered with a delivery date of May 31, 1944. Since it was not possible to find a diesel engine of suitable size for the boat, they settled on the Ore!-VShg-Moyugep engine.

The Bieber hull consisted of three sections connected by bolts. The bow section contained nothing but a ballast tank. Between the first and second bulkheads was the main compartment, where the pilot was. The third compartment contained the rear ballast tank. The SMPL had an Eyu-EM electric motor with a power of 13 liters. With. and a 32 hp OM petrol engine. With. from truck Ore!-VSHg. Maxi

the least external pressure that could be resisted was 30 m deep, and the pilots could only dive and lie on the ground while trying to escape. The disadvantage of the gasoline engine became apparent when one of the Biebers was found by the British destroyer Neadu. The craft was drifting because its pilot died in

as a result of carbon monoxide poisoning. Many of the lost Biebers met a similar fate, so the Bibers, like other midget submarines, were manned by volunteers. A total of 324 units were ordered for delivery during 1944: 3 units in May, 6 in June, 12 in July, 50 in August, 117 in September, 73 in October and 56 In November. Some built alparata were destroyed during the bombardment of Kiel by allied aviation. # The first combat unit of the Bibers was 261.K-Etotsie under the command of Bartels, which was part of Tenkogtipaldo 250. When Getkopipapfo 250 was fully manned, it included eight K-flotillas. On the night of June 29 to August 30, 1944, near Fecamp (France), eight-Eleven Biebers went on a mission. After a safe return to their base, the Germans announced that a landing craft had been sunk and the Liberty ship damaged during the attack, but Allied reports indicated that there had been no attack at that time. Ironically, most of the Biebers sank the next day as the Germans evacuated from Fekamla. The few vehicles that were able to be loaded onto vehicles and evacuated were - destroyed during a night attack by advancing Allied armored forces.

The range of planned operations with the use of "Bieber" was wide. One of them was Operation Caesar, an attack on the Soviet battleship Arkhangelsk (formerly the English Kouai Bouergeirp), which was anchored near Murmansk. Submarines ÿ 295, 17716 and Ts 739 left Harstadt in Norway on January 5, 1945, each submarine carried two Biebers. However, the operation was interrupted because a leak was found in the Biebers.

“Keeps of fuel from pipelines caused by constant vibration. It was also planned to use "Beeber" for

9 M. and V, Kozyrsvy 257

sabotage against the offshore oil pipeline of the allies of RI. Combat swimmers had to drill a hole in the pipeline and inject a corrosive liquid that would destroy the engines of any vehicles using "contaminated" fuel. Another plan was to drop the Biebers into the Suez Canal from a Vu 222 seaplane, where they would block the canal by sinking one of the ships there.

The statistics of the combat use of the Bibers are gloomy:

December 22/23, 1944 — out of 18 vehicles that went on a mission, 4 were sunk by British torpedo boats while still being towed to a given area, one was blown up by a mine, 12 vehicles did not return after the operation, and as a result of the operation only one English ship with a displacement of 4700 tons was sunk;

December 23/24 - 11 vehicles went on a mission - none returned; B

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December 24/25 - 3 devices went on a mission - none returned;

December 27 - 14 Bibers were prepared for the operation, however, two accidentally exploded torpedoes destroyed 11 devices, the remaining 3 devices went on a mission - none of them returned, one of them, Bieber No. 90, was. discovered two days later by the English ship Keadu drifting at sea with a dead pilot;

January 29/30, 1945 - out of 15 Apnarats that went on a mission, one drowned after a collision with a floating ice floe, 5 devices were forced to return with damage from ice floes, one was found washed ashore after spending 64 hours at sea in searching for a target, 5 vehicles failed to return;

I on March 6 - due to an accidental explosion of torpedoes, 14 vehicles sank, and 9 were damaged, on the same day 11 Biebers went on a mission - none returned;

March 14/12 - out of 15 vehicles, only 2 returned from the mission;

March 23/24 — out of 16 vehicles, only 7 returned to the base;

April 1945 - only 24 Biebers were at the base in Rotterdam, of which only 5 remained after participating in four operations. ·

The Bieber's shortcomings - a dangerous gasoline engine and the physical strain of a single crew member while operating the device - led to the development of the Bieber 11 double-seat apparatus by Nepdegchetke. However, soon the work on the Bieber P was suspended, and the development of the Bieber S SMPL with a 60-hp OM engine began. with., working on a closed glue. In November 1944, an experimental sample of the "Bieber" Sh was tested, the tests were continued in January 1945, but due to the lack of closed-cycle engines, the engine from the first version of the device was used. During the convoys, this sample fell into the hands of the British. Characteristics of "Bieber" ÿ: length - 10.4 m; diameter - ÿ 56 m; displacement - 6.3 tons; maximum speed - 3 6.5 knots on the surface and 5.3 knots in the submerged position; cruising range - 130 miles on the surface and 8.6 miles under water; crew - 1 person; armament - Yo torpedoes.

k- Characteristics of Vibe Sh: length - 11.8 m; diameter - B 5 m; displacement - 12 tons; maximum speed - B-knots on the surface and 5 knots under water; entry - 1,100 miles on the surface and 100 miles on the water; crew - 2 people; armament - 2 torpedoes.

Nesin

At the beginning of 1944: at a meeting with Hitler, Dönitz reported on the need to develop Type XXUP boats, which were supposed to be used for mining Vnik ships. The result of the meeting was the adoption of a decision on the development of SMPL Nesin (Type XXUPA). The double boat Nesin (“Pike”) was to be equipped with a removable mine in the bow. The design of Vodka also provided for a compartment for receiving or disembarking two combat swimmers (equipment and weapons were packed in rubber bags). Transportation of the boat to the place of combat use was carried out using a towing vessel or submarine. The originally planned cruising range was 90 miles, but since it was not possible to develop a small Nas gyrocom for this boat, the designers were forced to use the

carry

a smart gyrocompass that was heavy, took up a lot of space, and consumed a lot of electricity. As a result, the size of the boat has increased due to the reduction of the cruising range.

At the beginning of March 1944 in Kiel, the construction of three prototypes of the boat began at the Septapÿa-Me company. However, disagreements arose regarding the composition of the combat load of the boat. The Kriegsmarine command demanded that the boat be able to carry torpedoes for operations near the coast against enemy surface ships. Therefore, they began to consider the possibility of equipping boats with a torpedo or a drop mine. When equipped with a torpedo, additional batteries were located in the bow of the boat instead of a mine, which made it possible to increase the cruising range to 69 miles at a speed of 4 knots. At the end of March, Segpasha-Meg: received an Order for a serial batch of boats, but soon the work on building boats was interrupted. The built Nesin boats, designated from O 2111 to P 2113 and from P 2251 to P 2300, due to their unsatisfactory characteristics, were used in 311.K-NonShe (Geÿkottap-up to 300) only for personnel training. As soon as the Nesin project was terminated, the Kriegsmarine directed all its efforts to the development of the Zeshund SMPL.

Nes' characteristics: length - 10.5 m; diameter - 1.7 m; displacement - 11.8-12.5 tons; maximum speed - 5.6 knots on the surface and 6 knots under water; power reserve -

42 miles at 6 knots; power plant - electric engine Eyu-EM with a capacity of 13 liters. With.; crew — 2 persons; armament - 1 torpedo or 1 mine.

Seehund!

The Seehund was the most successful of all the SMPLs built for the Kriegsmarine. By June 1944, five prototypes were developed under the designation Type XXUVV, they differed in some details. The final version, Type XXUNV$, was a midget submarine with a crew of two, carrying two torpedoes from the outside. On the surface, the submarine was propelled by a Vivvilr 6-cylinder car engine, and underwater by an electric motor. The Seehund boat could sink to a depth of 70 m (although during tests at the shipyard they reached only 30 m) and had a very short immersion time - 3 s, since the Seehund turned out to be the best of the German boats, then she was the only one

,selected for further mass production. Before

- at the end of 1944, 169 vehicles were delivered, in total, 285 boats were completed by the end of the war, another 93 boats were found by the Allies in various stages of construction. The construction of boats was going on in Kiel (Noua jezhe - 3 and Segtashamey - 97), Elbing (8sÿÿÿÿÿn - 102), Ulm (Kioskpeg - 50), as well as in Graz (Siptepie) and Vienna (Paskeg).

The first Seehund operation at the mouth of the River Thames in early January 1945 ended in failure for them - 16 out of 18 boats that left the base were lost. The surviving crew

• The people quickly learned from this experience, and a second sortie on 17 January was without casualties. The Seehunds operated relatively successfully from February to May 1945, sinking 9 cargo ships with a total displacement of 18,451 tons and damaging 3 more ships with a total displacement of 18,384 tons.

In April 1945, the Seehunds carried out two special missions to supply food to the encircled German base at Dunkirk. Instead of torpedoes, the boats carried containers with food (they were called "oil-torpedo-food"), on the way back these containers were filled

1 5eenzpi - fur seal (German).

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we are mail defenders in Dunkirk. By the end of the war, the Seehund boats, which were in service with the five K-flotillas Joshkottapdo 300, participated in 142 operations, as a result of which 35 of their own boats were lost. Small submarines assigned numbers from 0 5001 to CH 6442 were extremely difficult to destroy with depth charges, requiring direct hits from aircraft. It is believed that most of the boat losses occurred due to difficult meteorological conditions. Operations with the Seehunls ceased on April 28, 1945.

In May 1944, Kurzak proposed an air-independent diesel engine 'using conventional fuel and its own exhaust gases reduced with liquid oxygen. In June 1944, an order was received to test and verify the applicability of this engine to small submarines. After successful testing, Kurzak proposed building several experimental vessels using Seeshund components. Work on them began in Elbing and Kiel, but by February

beehuld and Kgevosh-beerupd

1945 only managed to carry out bench tests of engines.

In 1945, these Type XXUPV boats were renamed Type 127. At the end of the war, designs for boats of the XXUPE, XXUPK and Type 227 variants were developed.

Characteristics of the Seehund (Type XXUPV): length - 11.9 m; width - 1.7 m; displacement - 14.9 tons; maximum depth — 40 m; speed - 6.5 knots (5.3 knots under water); cruising range - 300 miles on the surface and 67 miles under water; the power plant is a Vizzte diesel engine with a capacity of 60 hp. With. and an AES electric motor with a power of 25 hp. With.; crew - 2 people; in-

- weapons - 2 torpedoes.

Characteristics Type 227: length - 13.6 m; width - 1.7 m; displacement - 17 tons; speed - 8 knots (10.3 knots under water); power reserve - 71 miles at 8 knots on the surface and 17 miles at 10 knots under water; power plant — Vivvipr diesel engine with a capacity of 80 hp. With. and an AEO electric motor with a power of 25 hp. With.; crew - 2 people; armament - 2 torpedoes.

Characteristics Type HHUNE: length - 11.2 m; width - 1 m; displacement - 9.2 tons; speed - 22.6 knots (10.3 knots; under water); power plant - Walther engine with a capacity of 200 liters. With.; crew — | people; weapons - | torpedo.

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Characteristics Type XXUPK: length - 13.9 m; width — 1.7 m; displacement - 17.3 tons; speed - 9.5 knots (10 knots under water); power reserve - 60 miles at 2 knots on the surface and 34 miles at 2 knots under water; power plant - diesel engine with a capacity of 80 liters. With. and an 8 hp electric motor. With.; crew - 2 people; armament - 2 torpedoes.

"Molhe"

The first prototype "Molhe" (Mokpe - "Salamander") began to be tested in Eckernförde on June 12, 1944. The device had a cabin with a Plexiglas dome and carried two torpedoes. The Molhe, unlike the Bieber, was equipped only with an E/o-EM electric motor, the surface navigation motor was removed, so the problem of the harmful effects of combustion products on the pilot was solved. However, the maximum cruising range was reduced to 50 miles at 4 knots because of this. A

During the autumn of 1944, the first combat unit 41.K-EunShe (60 vehicles) was deployed in northern Italy, where it did not achieve any success. The second unit 412.K-Kyuishe also had no success during December 1944 in operations off the coast of Holland. The third and fourth divisions, planning

intended for use in Holland and Norway, were never deployed. A total of 363 vehicles were built, but since the Molhe did not have any special achievements in combat operations, it was then used to train the crews of more advanced mini-submarines. From January to April 1945, the Molkhe, which were in service with Geggkottap-up to 400, participated in 102 raids, sinking only 7 small enemy ships with a total displacement of 491 tons and damaging 2 ships with a total displacement of 15,516 tons, while their own losses amounted to 70 devices. Characteristics of "Molhe": length - 10.73 m; diameter - 1.8 m; displacement - 11 tons; maximum depth - 40 m; speed - 4.3 knots (5 knots under water); cruising range - 50 miles, power plant - electric motor 88U / S1231 / 7.5 with a capacity of 13 liters. With.; crew - 1 person; armament - 2 torpedoes. I

b Seeteuffel:

Of all the new projects, the Seeteufel (it was also codenamed Elephant, as well as Rgojeki Gosve) was the most developed. Its developer was Alois Loedige, head of the TUA torpedo development department, who proposed the idea of an ultra-small underwater

- Noah amphibious boats. It was a 35-ton apparatus with a length of . 14.2 m with a crew of two.

The first prototype was ready for testing in July 1944. It had an interesting feature - caterpillars, similar to those on a bulldozer or on a tank, with their help the apparatus could crawl along the seabed. Since it was not possible to get a diesel engine with a capacity of 80 liters. with., then I had to install an automobile gasoline engine. It was designed to move underwater at a speed of 8 knots and move on land at a speed of 10 km/h. The maximum immersion depth was 21 m. The Seeteuföl was to be armed with two torpedoes or mines, as well as machine guns or flamethrowers.

Tests in the bay of Eckernferda showed that the prototype has good maneuverability,
but power

1 beetesh! - monkfish (German).

engine was too small. Therefore, it was decided that in serial. in production, the apparatus must be equipped with a diesel engine with a capacity of 250 liters. With. and a 100 hp electric motor. With. During the tests, it was also found that, due to the small area of the tracks, the apparatus moves along the bottom with great difficulty. After the completion of the tests, a batch of serial devices was ordered. at the Vogemaga factory in Bremen, but production never started. At the end of the war, the test apparatus was transported to the test station Vaikorre! near Lübeck, where it was sunk. on the advance of the allies.

Characteristics of the Seeteufel: length - 13.5 m; diameter — 2.8 m; displacement - 20 tons; maximum speed — 10 knots (8 knots underwater); cruising range - 300 miles on the surface and 80 miles under water; crew - 2 people; armament - 2 torpedoes.

` "Reirhip"

The design of the Dolphin (Dolphin) apparatus with a displacement of 2.5 tons was developed by Dr. K. Haug in 1944. The apparatus had good hydrodynamic shapes, as a result of which it was possible to abandon ballast tanks for

surfacing, the cockpit canopy was made of plexiglass, like the Marder. This arrangement of the device gave him the ability to carry out a high-speed attack under water. Anparat was to be equipped with a torpedo or towed mine weighing 1200 kg.

The prototype was completed in the autumn of 1944; in tests, the vehicle reached a maximum speed of 17 knots in the submerged position. A total of three examples were built at the Press-Leichtbauweise. During tests on January 18, 1945, one of the Dolphins collided with a tugboat and sank. The remaining two devices were destroyed by the British in Travemünde on May 1, 1945.

Characteristics of "Dolphin" ÿ: length - 5.48 m; diameter —

, 1.0 m; displacement - 2.5 tons; power plant - electric motor AEO-AU 76 with a capacity of 32 liters. With.; speed -

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10 knots above water and 17 knots under water, immersion depth - 20-30 m; power reserve - 300 miles at 10 knots; crew — 1 person; armament - one 533-mm torpedo or 1200-kg towed mine.

More perfect was the "Dolphin" And, however, things did not go beyond the design stage. The boat had to have a more perfect hydrodynamic shape. The power plant is an OHo Kre1Chaitogyug (closed-cycle engine) for cruising at 15 knots on the surface and \aKer-Ti me for a short-term jerk at a speed of 30 knots under water. It was assumed that the device could carry a 500-kg drop mine, while the pilot had the opportunity to escape at high speed under the water. It was also supposed to tow a torpedo, but the end of the war stopped all work on this promising device.

Characteristics of the apparatus "Dolphin" P: length - 8.68 m; diameter - 1.3 m; displacement - 8 tons; crew — 2 persons; the reserve of the hall is 400 miles.

"Schvertval"

“Shvertval (ÿsÿzhegÿma!) is a project of a high-speed ultra-small submarine that could operate underwater as a “submarine fighter”. This project was considered in June 1944, despite the official

beÿmgegÿmÿÿ (

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Seÿmegÿmÿÿÿ I

the development of the Walther turbine for ultra-small flood-water boats, which made it possible to achieve high speed underwater. The crew consisted of two people, the apparatus was to be equipped with two torpedoes. The prototype "5shuuegizgÿ" 1 was an experimental apparatus, which at the end of the war was flooded in Lake Plun (part of the test site of the "Walter" company). In July 1945, the apparatus was discovered by the British, raised and studied in Kiel. An improved version of "bsimegimgai" 11, which began to be developed on the basis of prototin tests, remained on the drawing boards until the end of the war.

Characteristics of "Schvertval": length - 11.3 m; diameter — 2.4 m; displacement - 11 tons; power plant - Walther turbine with a capacity of 500 liters. With.; maximum speed under water — 26 knots; Hola reserve - 108 miles; crew - 2 people; armament - 2 torpels.

bgipapa!

"Team 456" developed in 1944-1945. deep-water (less than 1000 m) apparatus for rescuing crews from submarines in distress. StapaVa! was equipped with wheels and tracks. on which he could crawl as if on the bottom of the sea. as well as dry. The apparatus was equipped with an electromagnetic manipulator. as well as three searchlights. Before the end of the war, they managed to build a prototype.

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Stupdna!

Characteristics of Ohypdnaÿ: length - 3.6 m; diameter - 2 m; displacement - 1.5 tons; power plant — 2 electric motors with a capacity of 30 hp each. With.; speed - 3 knots under water; power reserve

- 20 miles; crew - 1 person.

Type ÿÿÿÿÿ

In 1945, a project was developed for a double boat Type XXXPIV. Boat 5.5 m long and wide | m had a displacement of 20 tons, as weapons it had to carry two torpedoes.

Mata

The Mata project was an example of what fantastic ideas some German engineers were trying to bring to life, who still believed in the final victory of the Germans, although the Allied forces had already entered Germany.

Masha was a hybrid of a hydrofoil and a submarine. Eki were placed in the building

page of two and engines. The upper wing housed the weapon launching systems. The apparatus also had two pairs of wheels with which it could roll out onto the shore and descend into the water.

The mat was designed to operate in different modes, namely: planing movement through the water at a speed of 50 knots, high-speed movement under water at a speed of 30 knots using a Walther engine and movement under water at a speed of 8 knots using electric motor.

neither!

At the end of the war, a project was developed for a deep-sea submarine $ 11 ("Smelt"), equipped with a Walther turbine. Presumably, the boat could be used to rescue the crews of sunken submarines.

Characteristics 5: length - 9.0 m; case diameter — 2 m; displacement - 24 tons; maximum immersion depth - 1000 m; speed - 10 knots under water; cruising range — 350 miles at 5 knots.

23. PITCH BOATS

After Hitler came to power, the Kriegsmarine began, contrary to the prohibitions of the Treaty of Versailles, to prepare a master plan for the reconstruction of the submarine fleet. It was supposed to develop five types of projects: a 500-750 t class boat (based on a 1917 OSH boat), an ocean minelayer, a 1500-ton submarine cruiser, a 250-ton coastal boat and a 500-ton coastal

. director min. By November 1934, the amount of raw materials and components secretly purchased from Holland, Finland and Spain was enough to build 10 Type IP coastal boats. With Hitler's approval, progress was accelerated, and by the end of 1935, 24 boats were under construction.

In 1936, England, in violation of the Treaty of Versailles, concluded a naval agreement with Germany, according to which Germany could be armed with 45% of the tonnage of British submarines and 33% of the tonnage of surface ships of the Royal Navy. The Germans, taking advantage of the new agreement, developed Type UP submarines in the 750 t class in order to better use the tonnage available under this agreement. On the eve of the war, it became clear to the Kriegsmarine command that the Type UN boat was too

Kom is small for operations in the Atlantic, but by that time it was too late to redesign her hull. Therefore, the development of an ocean-class boat under the designation Type IX began.

In August 1939, the commander of the submarine fleet, Admiral Karl Dönitz, had a boat of 65 boats at his start,

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Type XXI

including 32 Type 11 coastal boats, 12 Type 1 ocean class boats | and Type IX, as well as 21 Type UP boats. A month after the start of the war, 21 boats were on combat duty at sea. This time, Hitler, trying to avoid a rise in anti-German sentiment in the world, ordered the submariners to strictly follow the instructions of an international agreement signed several years earlier, in an attempt to "humanize" submarine warfare. However, the day after the start of the war, the boat 1) 30 perep

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Type XM C

the passenger liner AScheta with a transport for transporting troops was torpedoed, and the commander of the boat, Captain-Lieutenant Yu. Lemp, was under the threat of a tribunal. But the German Propaganda Ministry took this matter into their own hands, accusing W. Churchill and the Admiralty of the fact that the British themselves sank their liner in order to incriminate Germany. Until the end of December 1939, German submarines managed to sink 114 ships in the Atlantic with a total displacement of 427,915 tons.

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From 1935 to 1945, 1171 submarines were built and put into operation in Germany, of which 709 units were Type UP boats. In the middle of the war, there was a need for an urgent re-equipment of the submarine fleet. In addition to improving the main types of boats, the Germans were developing submarines equipped with qualitatively new power plants - Walther turbines. It was planned to equip the Type U boats, developed on the basis of the Type P boats, with these turbines. However, the Type U boat project was rejected, and the development of the Type HUP boats began instead. But this program was also canceled in November 1942 due to a shortage of hydrogen peroxide, and all efforts were concentrated on the development of Type XXI and Type XXIN boats, which appeared at the very end of the war. In 1945, design work was carried out on several types of boats at once - XXII, XXUN XXIX and so on until XXIX.

Type X

The ocean boat Type XA with a displacement of 2500 tons was intended for use as a minelayer. Work on the project was stopped due to the fact that Dönitz was opposed to boats of such large sizes. However, they nevertheless built eight Type XB boats of somewhat smaller displacement, they were the largest boats in the kriegsmarine and carried 66 mine tubes and 2 torpedo tubes in the stern. They were almost never used in their original most of them, which had external containers for storing mines, were used as supply boats.This "was a task for which they were not originally intended, but the heavy losses of the surface fleet forced the Kriegsmarine command to use boats of the Type HV in this

quality.

Uegvisheur 11 SE

prednitsa >

Muaygovv

Characteristics Type XB: length - 89.8 m; displacement - 1763 tons (surface) and 2177 tons (under water); maximum speed - 16.5 knots (on the surface) and 7 knots (under water); cruising range — 21,375 miles at 10 knots and 109 miles at 4 knots underwater; power plant - diesel engines with a capacity of 4200 l. With. (3131 kW) and 1100 hp electric motors. With. (820 kW); armament - 1 x 105 mm cannon (later removed), 1 x 37 mm anti-aircraft gun, 4 x 20 mm anti-aircraft guns, 2 torpedo tubes with 15 torpedoes and 66 mines.

Type x 5

The submarine-cruiser Type KhGimela was 115 long and had a surface displacement of 3140 tons. It could develop a surface speed of up to 23 knots; -mm gun. Only three Type XI boats were built, further production of boats of this type was stopped.

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Type ÿÿÿ The Type ÿÿÿ supply boat was designed to replace the Type IX” and Type XB boats. Of the ten ordered boats of the first series, called MIsiKy ("Dairy Cow"), six were built. They operated without much success until the Allies sank three of them in just one week in July 1943. Of the ten boats ordered from the second series, only four were completed. The unfinished boats were smashed into slipways during the allied bombing, and soon all orders were cancelled. A large-sized boat project was developed (KhGUV Type), but it was soon canceled.

HUP type

The prototype of the boat Type HUP was the pre-war project Type U. Type U was the first of many non-traditional designs that appeared in the firm of Dr. Helmut Walter. Project Y, which was rejected at the draft design stage, was a small boat the size of a Type P boat, but capable of reaching a speed of 30 cps under water. Like all other Walter's spoons, type U was designed for operation with a power plant running on hydrogen peroxide (perhydrol). This composition has

Walther submarine project, 1933 277

the ability to decompose into water and oxygen, which can be used to run diesel engines in a fully exhausted state. 4

A 60-ton prototype boat was developed under the designation UV (later called UV60 or U.60), driven by the new Walter power plant. This installation used not only oxygen, but also the high temperature formed during the decomposition reaction (about 900 °C). The steam and oxygen heated as a result of decomposition were supplied to the combustion chamber, where the supplied fuel (solar oil) was burned. The combustion products and steam formed during fuel combustion were supplied to the turbine, and from there to the condenser, in which the condensed water was separated from the residual carbon dioxide. The electricity generated by the turbine fed the electric motors of the boat. In fact, the power plant was a power plant, much more compact and light than diesel engines of similar power, and completely independent of the supply of external air. .

The greatest difficulties, however, arose with the manufacture and storage of perhydrol, which reacted violently with any impurity. For the storage of perhydrol, which cost about eight times more than diesel fuel, after various tests, a material neutral with respect to perhydrol was selected - synthetic rubber.

The first boat to receive a Walther turbine had a twin-shaft power plant with a capacity of 4360 hp. With. And

developed a speed of 19 knots. The new propulsion system consumed huge amounts of perhydrol (in terms of one mile - 25 times more than diesel), severely limiting the range of a boat equipped with only this propulsion system. The UV project was replaced by a new project \80, testing a prototype of the U80, built at Segtapa UUergy. Krupp concern in Kiel, began on January 19, 1940. During the tests, an unheard-of speed under water of 28 knots was achieved at that time.

After the relative success of the experimental boat UVO, the development of the Type HUPA boat in the class up to 300 tons began. The construction of the first boat under the designation U300 was supposed in 1941. problem. Therefore, the boat U300, which received the number ÿ 791, began to be built only in 1943, but it was never completed. It was supposed to build more advanced second and third boats Type HUPA under the designation U300 P and U\300 TSE, respectively, but work on them was stopped in favor of the following options for the project.

The final two versions of the HUPA project were similar, both were coastal boats in the class up to 300 tons. In total, two boats of each version were built, although all four had different power plant options. The boats Ma 201 (0 792, 0 793), completed in the spring of 1944 at the Blom and Voss shipyard in Hamburg, had an underwater speed of 25 knots and a cruising range of 1800 miles with additional diesel engines. Boats MK 202 (0 794, ÿ 795), stro

sailed on Segtapia\Me in the autumn of 1943-winter 1944, were slightly smaller in size, had a submerged speed of 24 knots and had the same power reserve. All four boats carried two torpedo tubes and were in service with the Kriegsmarine, although their combat activity was limited by irregular supplies of perhydrol.

After the successful completion of testing boats Type HUNA, an order was received for a slightly larger Type HUPV. The displacement of the boat increased by 40 tons, which went to provide increased fuel supplies for diesel, they were a little slower, but had a range of almost twice as much. 3 out of 12 ordered boats of this type were eventually adopted by the Kriegsmarine, two more remained in reserve, at that. while the construction of the seven remaining boats was abandoned. Interest in the project began to wane when it became clear that the boats were expensive to build, needed work, and were still dependent on supplies of hydrogen peroxide. So when the Type HUPV2 and B3 projects came along, they were lukewarm for the same reasons as the original B, and work on them didn't even get started.

Similarly, 12 boats of the HUPS variant were initially ordered but canceled soon after. The two final designs were attempts to achieve high submerged speeds without the Walther turbine. Type HUPE (E - Biekÿgo). instead of the Walther turbine, it had a more powerful electric motor and an increased number of batteries, but did not receive development. Type HUPK (Kÿsÿnÿ - closed cycle) replaced the Walter system with a much more powerful diesel engine. Instead of the complex process of perhydrol decomposition, variant K simply used the stored liquid oxygen, which fed the diesels in the submerged position. Both options could not compete with Walter's boats in terms of underwater speed, but they had one significant advantage: they did not depend on irregular supplies of perhydrol. Three experimental boats were ordered, only one of them, 1) 798, was launched in February 1945, but it was never completed.

Characteristics Type HUPA: length - 41.5 m; displacement - 312 tons (surface) and 357 tons (under water); maximum speed — 9 knots (surfaced), 21.5 knots

{under water} on the Walther engine and 5 knots (under water) on the electric motors; cruising range - 5550 miles at 9 knots, 210 miles under water on the Walter engine and 46.6 miles under water on electric motors; power plant - diesel with a capacity of 210 liters. With. (157 kW), 2500 hp Walter engine. With. (1865 kW) and a 77 hp electric motor. With. (57 kW); armament - two torpedo tubes with 4 torpedoes.

Type HMN

Despite the relative success of Walter's previous projects, the need to replace! boats of the UP series was such that Doenitz demanded the development of its Oksana version with improved characteristics. In September 1942, a meeting was held at Hitler's with the participation of Doenitz and Professor Walther. At this meeting, Dönitz demanded that all efforts be directed towards the mass production of Walther's boats "Project 476" (Type XUSH). Hitler was delighted with the new project and approved it. The Type KHUPT boat had a displacement of 1600 tons, the same dimensions as a class IX boat, but it developed a speed of 24 knots under water, although the cruising range was 25%

less.

Type XXI - By November 1942, however, it became obvious that the mass production of XYH series boats would not take place, and after the construction of two prototypes, orders were postponed. The project might not have been viable if Professor Oelfken had not proposed an alternative project. In April 1943, he presented a detailed plan for the conversion of the design of the boat Type HUNG with minimal changes to the boat Type XXI Eekiorot ("Electric boat"). At the same time, the dual power plant (Walter turbine and diesel engine) was replaced by light diesel engines, and the storage tanks for perhydrol in the lower part of the strong hull were replaced by batteries. Together with a simplified hull, this allowed the boats of the XXI series to reach high speeds (17 knots under water, 16 knots on the surface) and stay under water up to

three days. The power reserve of the boat was 11,000 miles, it could dive to a depth of 300 m. This made a 2100-ton boat

ki Type XXI is a much more dangerous opponent than Tep UP, which has become too vulnerable
from attacks by allied aircraft.

The boats had air conditioning systems, a garbage chute system, and a refrigerator so that the crew could eat fresh meat and vegetables. They were equipped with hydrophones with a detection range of up to 50 miles, a sonar ` (Vakop Sega), which could detect and select targets, as well as determine the range to the target. The boat carried 23 torpedoes with six torpedo tubes that were loaded hydraulically.

The first prototypes had already been ordered, and the Kriegsmarine command began to develop a boat building program. In accordance with this program, it was supposed to reach the production rate of 12 boats per month by August 1944. To ensure such a high production rate, it was planned that the shipyard would assemble the boat from eight sections manufactured at other enterprises.

However, reality disrupted all plans. Due to design delays, drawing sets were sent to shipyards late. They were sometimes incomplete or incorrect, causing problems with final assembly, ÿapart from this, the two main diesel suppliers were often subject to Allied bombing. Until the end of the war, the shipyards managed to deliver only 121 Type XXTA boats in the kriegsmarine, but it was already too late. Projects of variants XXI B, C, O, U, EiT were developed, but they were never completed.

Type XXIN 1

Boats Type XXIII was the last of the developed projects that managed to be built before the end of the war. Structurally, they were similar to the reduced “Electrobots”, they were approximately equal in size to the pre-war Type PA boats and had an increased battery capacity. The boat had a very low buoyancy margin (the difference between the surface and underwater displacement was only 24 tons), which made it possible to carry out

emergency dive. The boat on the surface was hardly noticeable, since only a thin tower above a very low hull was visible from the water, and the only losses of these boats were only from aircraft. The boat did not carry any cannon armament and had only two torpedo tubes. The main disadvantage of these boats was that, due to the tightness of the internal compartments, the torpedo tubes were reloaded from the outside.

In February 1945, the first Type XXIII boat went to sea for operations near the British Isles, after some time six more boats went on patrol, none of them were sunk. The last of them, ÿ 2336 under the command of Lieutenant Commander Klusmeyer, won the last victory for German boats, sinking two English cargo ships on May 7, 1945 inside the harbor of the Firth of Forth naval base. Moreover, one torpedo was used for each ship, the launch was carried out from a distance of less than 500 m. A total of 909 boats of this type were ordered, but by the end of the war, only 62 boats managed to be launched.

Characteristics Type XXIE length - 34.1 m; displacement - 232 tons (surface) and 256 tons (under water); maximum speed - 10 knots (on the surface) and 12.5 knots (under water); cruising range - 1555 miles, 202 miles under water; power plant - diesel engine with a capacity of 580 liters. With. {433 kW) and a 600 hp electric motor. With. (447 xW); armament. - 2 torpedo tubes with 2 torpedoes.

Type XXM 2

Large boat project Type XXM. Developed in 1945 in versions A, B and No.

Characteristics Type ÿÿÿÿÿ: length — 58, 8 m; displacement — 950 tons; maximum speed - 15.5 knots (on the surface) and 22.5 knots (under water with a Walther turbine); armament - 12 torpedo tubes and 2 twin M44 guns of 30 mm caliber.

Characteristics Type ÿÿÿÿ: length — 63 m; displacement — 1050 tons; maximum speed - 14.5 knots (on the surface) and 21.5 knots (under water with a Walther turbine); cruising range - 8000 miles at 10 knots and 160 miles under water

at 4 knots (130 miles with Walther turbine at 21 knots); armament — 12 torpedo tubes and 2 twin M44 guns of 30 mm caliber. 2

Characteristics Type XXUTUU: length - 52.6 m; displacement - 842 tons; maximum speed - 11 knots (on the surface) and 24 knots (under water with a Walther turbine); cruising range - 7300 miles at 10 knots and under water 158 miles with a Walther turbine at 24 knots; armament - 10 torpedo tubes and 2 twin M44 guns of 30 mm caliber.

HHMIE type

The project of a small boat Type XXUTI was developed in 1945.

Characteristics Type XXUP!: length - 32 m; displacement — 200 tons; maximum speed — 10 knots (on electric motors); cruising range - under water 2000 miles at 6 knots; armament - 4 torpedo tubes.

Type XXIX ÿ

The project of a large boat Type XXIX was developed in 1945 in options A, B, B2, C, O, E, SK, N, Ka, K2, KZi

`K4. Further development of boats XXI and XXIII series.

Characteristics Type ÿÿÿÿÿ: length - 53.7 m; displacement - 681 tons; maximum speed - 12 knots (on the surface) and 13.8 knots (under water); cruising range - 7100 miles at 10 knots and under water 125 miles at 6 knots; armament - 8 torpedo tubes with 8 torpedoes.

Characteristics Type ÿÿÿÿÿ: length - 57.5 m; displacement — 753 tons; maximum speed - 11.9 knots (on the surface) and 15.4 knots (under water); cruising range - 7100 miles at 10 knots and 175 miles under water at 6 knots; armament - 8 torpedo tubes with 8 torpedoes.

Characteristics Type ÿÿÿÿÿ2: length — 57 m; displacement — 790 tons; maximum speed - 15.3 knots (on the surface) and 15.4 knots (under water); Hola reserve - 7100 miles at 10 knots and 235 miles under water at 6 knots; armament - 8 torpedo tubes with 8 torpedoes.

Characteristics Type ÿÿÿÿÿ: length - 61.3 m; displacement — 825 tons; maximum speed - 11.8 knots (in over

water provisions) and 16.7 knots (under water); cruising range - 7100 miles at 10 knots and 250 miles under water at 6 knots; armament — 8 torpedo tubes with 8 torpedoes.

, Characteristics Type ÿÿÿÿÿ: length - 66.7 m; displacement — 1035 tons; maximum speed - 15 knots (on the surface) and 14.8 knots (under water); cruising range - 7100 miles at 10 knots and 150 miles under water at 6 knots; armament — 12 torpedo tubes with 12 torps.

Characteristics Type ÿÿÿÿÿ: length — 60 m; displacement — 785 tons; maximum speed - 13 knots (on the surface) and 16 knots (under water); cruising range - 6000 miles at 10 knots and 175 miles under water at 6 knots; armament - 8 torpedo tubes with 12 torpedoes.

- Characteristics Type XXGHOK: length - 57.8 m; displacement — 1000 tons; maximum speed - 12 knots (on the surface) and 16.5 knots (under water); cruising range — 10,000 miles at 10 knots and 225 miles under water at 6 knots; armament - 14 torpedo tubes with 16 torpedoes.

Characteristics Type ÿÿÿÿÿ: length — 52 m; displacement - 715 tons; maximum speed - 13 knots (on the surface) and 15.5 knots (under water); power reserve - 9 thousand miles at 10 knots and under water 120 miles at 6 knots; armament - 6 torpedo tubes with 10 torpedoes.

Characteristics Type ÿÿÿÿÿÿ: length - 57.8 m; displacement - 915 tons; maximum speed - 16.7 knots (on the surface) and 14.8 knots (under water); power reserve - 7200 miles at 10 knots and under water 694 miles at 6 knots; armament - 10 torpedo tubes with 18 torpedoes.

Characteristics Type HHGHK2: length -- 64.5 m; displacement - 1060 tons; maximum speed - 18 knots (on the surface) and 18.2 knots (under water); cruising range - 7200 miles at 10 knots and under water 800 miles at 6 knots; armament — 8 torpedo launchers with 18 torpedoes.

Characteristics Type ÿÿÿÿÿÿ: length - 51.8 m; displacement — 930 tons; maximum speed - 17.6 knots (on the surface) and 21.5 knots (under water); cruising range - 7200 miles at 10 knots and 1000 miles under water at 6 knots; armament — 8 torpedo tubes with 8 torpedoes. “ Z

Characteristics Type ÿÿÿÿÿ4: length - 64.5 m; displacement - 1060 tons, cruising range - 7200 miles at 10 knots; armament - 10 torpedo tubes with 18 torpedoes.

Type XXX 5 - A

Large boat project Type XXX. Developed in 1945 in versions A and B.

Characteristics Type XXXA: length - 70 m; displacement — 1200 tons; maximum speed - 14.6 knots (on the surface) and 15.6 knots (under water); cruising range - 15,500 miles at 10 knots and 210 miles under water at 6 knots; armament - 12 torpedo tubes.

Characteristics Type ÿÿÿÿ: length - 65.7 m; displacement — 1170 tons; maximum speed - 14.6 knots (on the surface) and 15.6 knots (under water); cruising range - 15,500 miles at 10 knots and 225 miles under water at 6 knots; armament - 8 torpedo tubes.

Type XXXI

The project of a large boat Type XXXI was developed in 1945.

Characteristics Type XXXI: length - 54.7 m; displacement

. schenie - 1200 tons; maximum speed - 14.3 knots (in over-`

water position) and 16.7 knots (under water); cruising range - 15,500 miles at 10 knots and 260 miles under water at 6 knots; armament — 12 torpedo tubes.

Type XXX 5

Boat project Type ÿÿÿÿ middle class, developed in 1945.

Characteristics ÿÿÿÿÿ: length — 40 m; displacement — 360 tons; maximum speed - 18 knots (on the surface) and 18.2 knots (under water); cruising range - 1550 miles at 9.5 knots and under water 1600 miles at 6 knots; armament — 4 torpedo launchers with 6 torpedoes.

Type XXXU - A The project of a large boat Type XXXU was developed in 1945. Characteristics Type XXXU: length - 50 m; displacement — 1000 tons; maximum speed - 18 knots (in over

water position) and 18.2 knots (under water); power reserve - 7 thousand miles at 10 knots and under water 160 miles at 22 knots; armament - 8 torpedo tubes with 12 torpedoes.

Type XXXVI

The project of a large boat Type ÿÿÿÿÿ was developed in 1945. 7

Characteristics Type ÿÿÿÿÿ: length - 61.2 m; displacement - 1000 tons; maximum speed — 22 knots (with Walter turbine); power reserve - 7 thousand miles at 10 knots and under water 110 miles at 22 knots; armament - 10 torpedo tubes with 10 torpedoes.

Aircraft OV RE

Aircraft OV RE

Aircraft Po 335 U13

Aircraft Nv 132

Aircraft H IX ST (top and front) Aircraft H IX ST (bottom and side)

Aircraft H X Aircraft N XIII a

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Aircraft N XIII Aircraft N XUSH A

Aircraft H XIII B Aircraft H IX

Aircraft H IX U2

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RUT aircraft. Javbcheregeg Zenger rocket bomber

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Aircraft ZK R14-01 Aircraft OM (option)

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Aircraft Not R.1077 Coteo

Aircraft Ag 234

Aircraft Ag 234 and rocket E.377

Aircraft Not R.1077 Jan 1

Aircraft Not 162 and Ag 344

Aircraft Not R.1077 Jan Pÿ

Ashyga shie son Eun

Aircraft Ag E.381-1 Aircraft Ag E.381-P

Av 6 aircraft Va 349 A aircraft

Wu R213 aircraft Wu R215 aircraft

Aircraft Wu Ae607 Diskoplan Fokke

Interceptor W. von Braun

Aircraft Katteg Aircraft ÿÿ 166/11

Plane E! 103K (training version)

Plane E! 103A (combat version)

Aircraft Ei 103K in attack

Plane E! 1038 (training version)

Plane E! 1038 (combat version)

Aircraft Ei 103K in attack

Aircraft Me 163

Plane Me R.1103-1

Aircraft Me 163 from ÿÿ 400

Me 262 aircraft with additional Jogip ramjet

Aircraft Me 262A and ÿi 287

5

Aircraft 11 R.13 Aircraft 14 R.01-117

5

Aircraft 11 RAS Aircraft 11 R.09

+4

Plane 14 R20 Plane Sh R11

Rocket plane A4b

Rocket plane A9

Rocket plane A9/A10

Airplane A6

seagull

Tank Kaye

Gank E 100

Tank Mass

Srpveg

Tank Rl. Cream IX

Tank Ra. Kruu X

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Self-propelled gun \U/aNetigareg 10.5

Kashpeg

The project of a superheavy rocket launcher \ Megfeg. Caliber 85 cm

Gun KK 15E58

Pog's super-heavy rail gun. Caliber 80 cm

Super heavy rail gun Gapre Vgipo

Super-heavy rail gun Hese Vgipo

Superheavy rail gun ZsVzuege Vgshpo

Super-heavy rail gun Tzheodog Vgipo

Super heavy rail gun K12 (E)

Kim 2 Cruise missile EU 10 Vu 143V Vu 246

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Wu 1438 (tandem version)

Cruise missile 3/1.

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BT 200

X4

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Mom

IT 1000

Kozheg (prototype)

BT 700A

VMUU Segae 78

"Two

Gliding assault vehicle Masha

The project of the carrier of ultra-small submarines O-Voostisegenÿke

Exploding Boat Togpayo Ultra-small jet-powered lol Stiptwo!

Ultra-small submarine. One of the variants of the exploding Beit boat Frgepevoog

Deep sea midget submarine Hati

Ultra-small submarine. Type MK 202 1942

Ultra-small submarine. Type XI 1943

The project of a midget submarine with a high-speed snorkel. Type XXXTU

Submarine. Type XXI!

Submarine fighter 5simegska! T

Submarine fighter Sshuegÿÿÿa! P

Midget submarine ÿÿÿÿÿ

Ultra-small submarine. Type XXUP E

Midget submarine Nes

Midget submarine Kteizizshi-5e

Submarine Seesipa

Midget submarine Moÿsÿ

Midget submarine eeeeee! equipped with tracks for landfall

Midget Submarine Projeks K

Torpedo SHT 1000 with cabin for sea trials

Manned torpedo Magdeg

Manned torpedo Mereg

Experimental torpedo 17 10006

Torpedo isip

Rocket-powered torpedo 17 1500

Torpedo O5 shÿ

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Torpedo S7 K-Vin

Barrel of a 600 mm self-propelled mortar

Mezre self-propelled anti-tank gun

Self-propelled anti-tank gun "Marder P"

Zyigtressnisg IP

Assault gun "Brumber GU"

Assault gun "Sturmtigr"

Tank destroyer T-1\

Tank destroyer "Jagdpanther"

Tractor 54. K. 7 Tank Rg. Cr 1

and Tank Rx. KrKu P Tank Rx. Kr Pÿ

Tank Ra. Krbe IV

Tank Rg. Kruu UI

Alkett Raumgerat". View of the main wheels

Minesweeper <

Tank 38 (0)

Super heavy tank "Maus"

Tracks "Mausa"

Half-track armored personnel carrier $4. Ke. 251

Self-propelled mine "Toliaf"

Self-propelled mine "Goliath". Front view

Half-track motorcycle $4. K. 2

Half-track motorcycle 54. KR. 2. Rear view

Remotely controlled tankette V TU

Remotely controlled wedge in GU. Back view

Espdeg

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on the!

CB 1/6 CB4

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pE5/r-P (Re) Zeenipa SV Nesin

sea

SV Tapdet 500/2 150

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Anti-aircraft missile MITO

KBeniosMeg V Sh Ballistic missile A4 Kÿeÿpÿobe

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Hs 117N Ns 293 A 1

Hs 2930 H5 298

that

Nz 298 U1 Nv 298 U2

Hv 293 C1

H" 293 C2

Nv 293 SZ

H 293 0

Hv 293 U4

$ - a torpedo with an acoustic fuse; { - torpedo with a turbine; K - torpedo with a piston engine.

67a

The C7a torpedo was equipped with an engine that ran on compressed air and "decaline" (decahydronaphthalene). 06 - the hot gases that developed in the combustion chamber were fed through the nozzle to the propeller drive, causing it to rotate. The disadvantage of such an engine was the trail of exhaust gas bubbles that it left behind the torpedo. If the attacked enemy ship detected the trailing torpedo in time, then it had time to evade the carrier. The torpedo was produced in several versions:

T I - pre-war model, due to the presence of a bubble trail after the shot, it was used mainly at night;

TRAT 1 was equipped with the GAT maneuvering device (since 1942), which made it possible to "snake" across the course of the attacked enemy convoy, which increased the efficiency attacks;

TIIIOTI - with the ShT maneuvering device (since 1944), which allowed the boat to attack the convoy from any position, was used for test purposes;

TEGOT N - with an improved version of the GOT device, used in test units;

T KhGU - it was a C7a torpedo with a reduced range, used on the SMPL.

Characteristics of C7a: diameter - 533 mm; length - 7.163 m; weight - 1538 kg; explosive weight - 280 kg; number of engine operation modes - 2; engine rotation speed — 1470/1280 rpm; speed — 40/30 knots; cruising range - 7.5 / 12.0 km; engine power - 350/225 l. With.

b7e

The C7e torpedo had a 100 hp electric motor as a power plant. With. Electric motor powered by batteries

290

a precise mechanism drove the screw. To increase the efficiency of the engine, it was heated before firing in a torpedo tube to a temperature of 30 C. Initially

the speed and range of the Ode torpedo were lower than those of the C7a, but in 1942 it was possible to increase the capacity of the Pb/PbO batteries and thus increase the range. The torpedo was produced in several types:

TP is the basic type, equipped with two batteries with a capacity of 93 A;

ÿÿÿ - with a molded engine:

TSh GAT P - torpedo with GAT;

T Sha - with increased battery capacity (up to 125 a), which gave an increase in range up to 7500 m;

T Sha GAT P — variant T Sha with GAT;

T Sha GOT G - option T Sha with GT, experimental model;

T Sha HERE i - T Sha e GOT, serial model;

T PE - intended for the Marder man-controlled torpedo, maximum speed 2.5 knots; And

ÿÿ — intended for human-guided torpedoes and SMPLs (Marder, Seyhipa, etc.), cruising range 4 km at a speed of 18.5 knots, weight 1342 kg;

T SHO Raske! - a special torpedo (speed 9 knots and range up to 57 km), used to attack guarded ports or similar protected targets, it had a length of 11 m and was equipped with a TDJT device;

T She Kgeigotseg ("Viper") - an improved version of T Shs (altitude 7500 m at 20 knots);

ÿÿÿ ÿÿÿÿ (“Sokol”) - ÿÿÿ with an acoustic fuse, because of the relatively low speed it was used against cargo ships;

TU Gavpkopiv - modification T [U] for use against high-speed ships guarding convoys, developed a speed of up to 24 knots with a cruising range of 5.7 km;

T Ua - modification of T U, developed a speed of up to 21.5 knots with a cruising range of 8 km;

TM - TI with increased battery capacity, which increased the cruising range to 7.5 km, was equipped with a GOT device and carried 300 kg of explosive:

TX ÿrippe - T 11 with control by wire, it did not justify itself in use, as it rarely provides

there was an opportunity to calmly control the torpedo after the shot; -

T XI 2aÿpkopÿv II - modification of T Y with a reduced susceptibility to malfunctions from the impact of Allied aquetic buoys.

Characteristics of O7e: diameter - 534.6 mm; length - 7.163 m; weight - 1608 kg; explosive weight - 280 kg; number of engine operation modes - 2; engine rotation speed — 1700 rpm; speed - 30/28 knots; cruising range - 5.0 / 4.8 km; engine power - 350/225 l. With.

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050.

The experimental C5e torpedo was a smaller version of the C7e torpedo, designed for the SMPL. Vynuskalas only one type T HI.

Characteristics b5e: diameter - 534.6 mm; length - 5.5 m; weight - 1260 kg; explosive weight - 280 kg; engine rotation speed - 1700 rpm; speed - 30 knots; cruising range - 3 km; engine power - - 100 l. With.

b65sh Experimental model under the designation Nesip, equipped with a Walter engine.

Torpedo Sbi 292

bi

Variant of the C7 torpedo with a Walter engine. The following types were produced:

TUN Meshrassy - a torpedo with a GOT device;

TUSH BISILISHI;

T HI K-Viÿ is a T UP with a reduced fuel supply for the engine and a shorter range. Prototype 1 - a prototype with a turbine and sea water injection, 'various guidance devices were tested. Proto-TYPE 2 - a prototype with a closed-cycle engine KM 8.

Characteristics of C70!: diameter - 534.6 mm; length - 7.163 m; weight - 1730 kg; explosive weight - 280 kg; number of operating modes - 1; rotation speed - 1640 rpm; speed - 45 knots, cruising range - 8 km; power - 430 l. With.

bik

An experimental model under the designation Kiirrbvshy, equipped with a Walther engine with a piston engine instead of a combustion chamber and a turbine.

C7 Zet 293

Torpedo C? "K-Woon"

TMA

A bottom contact mine with 230 kg of explosive was placed at depths of up to 50 m. With a hull length of 3.64 m, two mines could fit in a torpedo tube.

`

tmv Bottom non-contact mine with 560 kg of explosive, placed at depths of up to 50 m. With a hull length of 2.15 m, three mines could fit in a torpedo tube.

tme :

A bottom non-contact mine with 930 kg of explosive was placed at depths of up to 50 m. With a hull length of 3.39 m, two mines could fit in a torpedo tube.

5MA

Bottom mine with 350 kg of explosive and an aluminum shell, which was supposed to make it difficult to detect using magnetic devices. It was placed at depths up to 600 m.

25. EXPLODING BOATS |

For the first time small-sized assault boats were developed by the Italians, in 1936 they created a motorized boat called Barsipo, equipped with explosives weighing 330 kg. The boat was controlled by the driver, who was located aft in the ejection seat. After numerous

During the trials, boats of this class received the official designation MTM (modified tourist boat) and entered the service of the Italian Navy. Following this, two other models were produced - MTE (reduced tourist boat) and MTI (slow tourist boat), and a little later, a modified MTM model (modified tourist torpedo boat), which had more powerful weapons and crew in consisting of two people. In 1943, the larger model MTSMA (Modified Extended Tourist Torpedo Boat) was adopted.

The most famous operation with the use of exploding boats was the Italian attack on the British naval base in Grand Harbor (Malta) on the night of July 26-27, 1941. Although the result of the operation turned out to be sad for the Italians and 8 exploding boats, it made a strong impression on the Germans.

One of the last weapons developed by Japan in its last effort to avert defeat was the 5-puo suicide boat. It was a motor launch equipped with a powerful explosive charge or two depth charges in the bow. The idea was that the pilot would set a course to attack you.

295

attacked target, removed the fuse from the fuse and then held the course until the boat collided with the ship. The weight of the explosives was enough to sink a medium-sized ship, by the end of the war were built. about 6 thousand boats Sÿÿpuo.

Having studied the experience of the fleets of Italy and Japan, the Kriegsmarine in the second half of the war began to work on the creation of small-sized assault boats.

Sprengbot A

Exploding boats "Sprengboat" (Frgeperoote) Kriegsmarine for the first time began to prepare for use against the Allies, who were planning an invasion of Normandy. These. boats were characterized by very high speed combined with great maneuverability. They were built at numerous shipyards in Germany and in the countries occupied by the Germans. The Sprengbot was equipped with an explosive charge, which was activated when it hit the target. Depending on the circumstances, the boat driver approached the target at a distance of 100 m or less, leaving himself time to eject from the boat into the water. Immediately after the ejection, the driver opened an inflatable rescue boat, which was packed

how pa-

- rashut and served simultaneously as a seat and back when the driver was in the Sprengbot. The most common exploding boats were partially converted sports boats 5.2 m long and 1.9 m wide. They were equipped with a gasoline engine, such as the Alfa Romso engine, which allowed speeds up to 32 knots. While overcoming anti-submarine nets, ropes or chains, the outboard motor rose “above the water. When fully loaded, the boat could sail for 5 hours.

These fast vehicles formed small assault teams, usually consisting of two exploding boats and one command boat (KolupapaoBooge). Both drivers of the exploding boats ejected or jumped into the water shortly before hitting the target, after which they were picked up by the command boat. Some boats were equipped with radio control

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current. equipment, after rescuing the drivers by the command boat, the Sprengbots were controlled from it by radio.

Ships, submarines, transport aircraft and cargo gliders were used to deliver the boats to the site of the operation. Thus, for example, during preparations for an operation in 1944 against the British naval base at Scapa Flow, it was planned to use a Co 242C-1 glider adapted for landing on water. This operation was assigned to a sabotage group from the KS 200 squadron. The glider fuselage had the shape of a boat, inside

Air bags were installed on the hull to increase buoyancy, and there were stabilizing floats under the wing. The glider was supposed to carry two boats in the cargo compartment - one Sprengboat and one Sturmboat assault boat (Sÿÿot Boooÿe). The exploding boat was equipped with a Siemens electric motor (beetepe) to ensure noiseless movement during the attack. | A 1000-kg explosive charge was installed in the middle of the boat, the driver was located at the back. “Stormboats” during the operation were supposed to divert the attention of the enemy by their actions and make it easier for the exploding boats to break through to the intended targets. After the attack, the Stormboats were supposed to rescue the surviving drivers of the exploding boats and deliver them to a safe place.

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Chpze

One of the most famous exploding apparatuses were radio-controlled boats of the Ze type (“Lentil”). These boats had a length of 5.75 m, a width of 1.75 m, and a displacement of 1.8 tons.

the minimum speed ranged from 33 to 35 knots. An explosive charge weighing approximately 400 kg was located below in the stern of the boat. In a collision with an enemy ship, the charge broke through the bottom of the boat, went down under the ship and exploded there.

Zepp

Zsvciep ("Sled") was a flat glider 7.5 m long with a 145-P5 Rapgertorog engine. The arc in the bow served for the reliable operation of the charge fuse. Upon impact, it deformed a special mechanism that actuated the fuse. In the bow of the boat there was a container with 300 kg of high explosive. A boat with a combat swimmer (Katr-vsnushipeg) approached the target at the minimum possible distance, after which the swimmer fixed the controls of the boat, and he himself jumped into the water. When the boat collided with the target, a small charge was first fired, designed to break the boat's hull, after which the bow went into the water, and the main charge exploded at the calculated depth.

At the beginning of 1945, the second version of the cutter SeÿÿChep P was developed, 8.5 m long, equipped with a more powerful engine and capable of carrying two torpedoes in the bottom recesses.

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"Tornado" yet.

“The most exotic was the boat “Tornado” (Togpayo) developed by ALA ri rine. Equipped with explosives, it was intended to break through the allied fleets and create great destruction there. The boat was a catamaran made up of two floats of a Jipke ÿ 52 hydroplane, the Agris Az 014 PUVRD, originally developed for the Neseeg Ei 103, was used as a power plant. With this engine, the Tornado could reach a speed of 90 km/h in good weather and smooth sea surface. The prototype "Tornado" carried a 700-kg explosive charge in the bow. Having directed the boat to the target, the pilot ejected and remotely controlled the boat from the water.

26. TANKS

“The Germans started the Second World War with the main tanks R?Krbu Ti R2Kreu P (Rap2egkatremaret - armored fighting vehicle), but over the course of several years they were gradually withdrawn from service and replaced with new tanks R?Krbu Sh and R/KrVu GU . The last of them remained in production until the end of the war, undergoing modernization of guns and armor in order to withstand the improved enemy tank forces on the battlefields. Panther and Tiger tanks appeared towards the end of the war, but they could not be produced in the required quantities due to lack of materials and manpower. The Panther and Tiger were put into production without proper testing, so many of them were lost during initial deployment as a result of mechanical failures. The Tiger was, in particular, a very heavy tank and lacked mobility on the battlefield. However, its armor and cannon were top notch, and this tank proved to be difficult to destroy. Quite often, four American Sherman tanks, in order to neutralize only one Tiger, used

The following tactics: two tanks called fire on themselves, often dying in the process, while the other two tanks attacked the Tiger from the flanks. - p Nevertheless, the ever-increasing power of Soviet armored vehicles forced German designers to develop new tank designs. To a large extent, the development of such projects was carried out by Porsche (Roges), since its ingenious leader, Professor Ferdinand Porsche, often came up with unusual solutions to technical problems, even if they turned out to be in the end.

5 300 E

ends unfeasible due to the too high cost and complexity of the project. Toward the end of the war, the development of super-heavy tanks began, as a result of which prototypes of the Maz and E 100 tanks in the class over 100 tons appeared. In addition, proposals appeared to create giant tanks weighing 1000 tons and 1500 tons. Super-heavy and giant tanks were supposed to become mobile means of reinforcing long-term defensive lines to cover possible gaps between strong points in accordance with the changing situation.

The Armaments Department assigned to new projects of armored vehicles the designation UK (Metsisÿÿkopsÿgikyÿop - ÿÿ - experimental design) with a three- or four-digit number, in which the first or two first nifras denoted the weight class of the projected sample in tons. When firms submitted their projects to the competition, the projects were given the same designation, accompanied by an additional letter in parentheses, which denoted the name of the developer. For example, in the designation of UK 4501 (N) and UK 4501 (R), the letter "H" meant Nelzspe! (“Henschel”), and the letter “P” stands for Rogvezhe (weight class 45 t, first design). The Matza project, probably for reasons of extreme secrecy, never had such a UK marking. For a new series of tank projects, conceived by the Army Weapons Development Department in 1943, the letter E (Epÿ-mÿskÿshpr — development) was used, followed by numbers indicating the weight class of the tank. Along with this official numbering system, firms used their own. designations, the Rogvse company, for example, used a chronological numbering system. In February 1944, the designation R?Kruu was canceled for production tanks, instead only the name ("Panther" or "Tiger") and the letter denoting the modification were used.

RÿKrim U 5

Work on the creation of a tank more advanced than the ReKrbe RU began as early as 1937. Nepspe companies were connected to them! and Roxxie, but progress was slow due to frequently changing requirements.

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Initially Nepste! created two samples of an intermediate type tank (0. No. Guy R. No. P), and then the UK tank was developed on its basis. 3001(N). A total of four prototypes were produced: the first two in March 1941 and two more in October of the same year. The first and second models were converted in August 1941 by Rheinmetall-Borsig into a 12.8-cm self-propelled artillery mount (in Germany, the gun caliber was indicated in centimeters). One of these self-propelled guns took part in the fighting on the Eastern Front.

By September 1939, the Rotzeve firm had developed a design for the UK 3001 (P) tank. It was assumed that it would be equipped with a 7.5 cm gun or, if possible, a 10.5 cm gun. Two prototypes of the tank were built at the German factory in Lower Austria. The design of the tank used a new power plant, which was later used in all models of Professor Porsche. The engine powered generators that powered two electric motors with a capacity of 210 hp each. With. Electric motors and drive systems caused problems during testing

“in 1941-1942.

At the end of 1941, a requirement was issued for a new tank with a long 75 mm gun, new armor and larger diameter rollers. In accordance with these requirements, the company Pachiet Wepg presented the design of the UK 3002 (RV) tank, while the MAM company presented the design of the UK 3002 (MAM). For serial production, they chose the MAM project, which was almost; a copy of the Soviet T-34 tank. The new tank received the designation R2Krÿy U Rapsheg (''Panther'') (ZAK 171).

It, in comparison with the R7Krokh GU tank, had more rational forms and was armed with a 75-mm cannon, the projectile of which at a distance of 1000 m pierced armor 130 mm thick. A number of innovations were used in its design: hydraulic control of the brakes, a device for blowing the barrel with compressed air after a shot, a hydraulic drive for turning the turret, etc. However, the tank turned out to be difficult to manufacture and operate, its technical reliability was low. E

The first prototypes of the new tank were completed in September 1942, and the first vehicles of modification A

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left the MAM factory only two months later. The Daimler-Benz (Yuavmeg Veph) firm produced technological equipment for the production of the Panther, and in 1943 the firms Nepsyey, M! etzasney and about a hundred other subcontractors were connected to this program. It was planned to produce 600 Panthers per month, but due to frequent bombing by Allied aircraft, the maximum production did not exceed 330 tanks per month.

The Panther was put into production without proper testing, and numerous errors soon became apparent: indeed, at the very beginning of combat use, more Panthers were lost due to mechanical failures than to enemy action. The tank first came into action on the Eastern Front in July 1943 during the battles near Kursk and all fronts. During the war, four more has since been used on ,
tank modifications - B, C, Pi C, of which only modifications O and C were launched into the series.

Once the mechanical problems were fixed, the Panther became the best German tank of World War II. On some tanks of modification C, devices were installed

night vision EC 1250, the side armor was reinforced with hinged bulwarks that protected against cumulative projectiles, and zimmerite coating was applied to the armor to protect against magnetic mines and grenades. Panther variants included a reconnaissance tank (Veobastipavrapgeg Rapÿÿet), a tank destroyer Oardralÿÿeg), and a command tank (Vervärget Rÿliÿÿr).

By the end of the war, a new Rapteg Pÿ tank was developed, equipped with an 88-mm K\K 43 cannon with a barrel length of 71 caliber. However, before the surrender of Germany, only two prototypes of the tank were built. Total during the war

. about 6,000 R?Kruu U tanks were produced. In the post-war period, the French army was armed with a large number of Panther tanks.

4 Characteristics of R2Krbu U Rapÿg Anz A: crew --

“ 4 people; weight - 45.5 tons; length (with gun) - 8.86 m; cor-

. pusa - 6.88 m; width - 3.43 m; height - 3.1 m; power plant — Maubas NI, 230 R engine with a capacity of 700 hp. With. (522 kW); maximum road speed

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46 km/h; cruising range on the road - 177 km: armament - 1 x 75-mm cannon and 3 x 7.92-mm machine guns; armor thickness - 80 mm (hull front) and 100 mm (turret front).

RgKrim

In 1941, Henschel was given an order for the development of a 36-ton tank, called UK 3601 (N), which was supposed to have a maximum speed of 40 km/h, good armor and a powerful gun. This tank had the main components in common with the UK 3001. The main weapon was to be a cannon with a conical bore {Tool 0725). However, after Hitler banned the use of such guns, the tank was converted to another gun. The prototype of this tank was built, but the work was not further developed, because in May

` 1941 the company received an order for a 45-ton tank UK 4501, 88- _ which was supposed to be equipped mm anti-tank

howling cannon. The project was to be completed by April

next toda. Since there was no time, "Henschel"

used in the design of the new tank UK 4501 (N) those

technical solutions obtained during the development of tanks

UK 3601 (N) and UK 3001 (N).

An alternative tank project under the designation UK 4501 (P) was developed by Porsche. In the design of the UK 4501 (R), the main components from the UK 3001 (R) were used, but adapted for a heavier machine. tires. The engine was moved to the rear of the hull 3 ca, creating an even distribution of weight on the tracks, the power of the electric motors was increased to 320 hp. With. :

Both competing prototypes were built on time, after which they were demonstrated at Hitler's birthday party. As a result, the Henschel project was selected in August 1942 for mass production under the designation P2Kryu M Tiveg Ac E (54KG 181). "Tiger" had. box-shaped hull with vertical frontal and side armor. In the front part there were a driver-mechanic and a gunner-radio operator, mechanisms were also located here.

transmission. Fighting compartment with a cylindrical . the turret was located in the middle part of the tank hull, the engine was located in the rear part of the hull. tank equipped

With a semi-automatic 88-mm anti-aircraft gun with a barrel length of 56 calibers, the armor-piercing projectile of this gun at a distance of 1000 m was able to penetrate 115-mm armor.

In case the tests of the pre-production "Tigers" failed, the Porsche company was ordered a batch of 90 UK 4501 (P) tanks. Subsequently, they were completed as a tank destroyer under the designation Rapgepareg Tiveg (R) KegdipapdF (54ÿÿÿ 184). The tank destroyer got its name after the head of the company F. Porsche. The last of 90 Jeegfpald machines were delivered in May 1943, but most of them were lost on the fronts due to technical failures in the complex propulsion system and because of their clumsiness.

The "Tiger" was in serial production from August 1942 to August 1944, in total 1350 tanks were produced during this time. There were four versions of the "Tiger": the main tank, the commander's tank (Be vrapheg Tireg), which was actually the main tank with the machine gun removed, reduced ammunition and added radio equipment.

„ ore, repair and recovery tank with a removed gun, instead of which a powerful winch with a pulling force of 10 tf was installed, and a self-propelled gun “Sturmtigr” (Sgigtiret) with a mortar of 380 mm caliber. Commander's tanks were built 84 copies, and "Sturmtitr" only 10 copies.

At one time, the Tiger was one of the best German tanks with a powerful gun and good armor, but it was structurally complicated and therefore difficult to manufacture. One of the main drawbacks was that its wheels often

. a hundred were clogged with clay and stones. On the Eastern Front, this could be a disaster, during winter nights the clay would become so muddy that by morning the tank would be immobilized, and often at a time when the Soviet

, the ska began their attacks. The second disadvantage was

“that when moving the tank along the roads they used

51.5 cm wide tracks, while 71.5 cm wide tracks were used for cross-country or combat because it gave lower pressure
to the ground.

The main armament included the 88 mm Cook 3 gun.

and two 7.92-mm machine guns MO 34. The number of shells for

I

alive

guns - 84, and for machine guns - 5850 rounds. The Tiger was first encountered by British troops in Tunisia, and then it appeared on all fronts.

Characteristics of R2Kreu UI Treg AvzG E: crew - 5 people; weight - 55 tons; length (with gun) - 8.24 m; hull length - 6.2 m; width - 3.73 m; height - 2.86 m; power plant — Mauhashy NI engine. 230 R45 with a capacity of 700 liters. With. {522 kW); maximum speed on the road - 38 km / h;

cruising range on the road — 100 km; armament - 1 88 mm cannon and 2 7.92 mm machine guns; armor thickness - 100 mm (hull front) and 110 mm (turret front).

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The "Tiger" was still just launched into mass production, and a decision had already been made to develop a version of the tank with more powerful weapons and reinforced armor. Again, Henschel and Porsche were involved in the development.

F. Porsche initially developed a tank project based on the UK 4501 (P) project, but equipped with a 150-mm gun. | This project was rejected in favor of the new UK 4502 (P) with an 88 mm gun, however, this was soon canceled due to the presence of an electric transmission that used too much copper, which was scarce at the time. By this time, 50 turrets of this variant were already in production, so they were later adapted to Henschel tanks.

The project UK 4503 (H) of the Henschel company was completed in October 1943, and it was declared the winner. Production of the tank "Tiger" P or Reakrbu Uÿ Treg P Apz! In (54k 182) began in Kassel in December 1943, the first 50 tanks were equipped with Porsche turrets, but all subsequent tanks were equipped with Henschel turrets. The “Tiger” P or Kopetseeg (“Royal Tiger”) appeared for the first time on the Eastern Front in May 1944, and on the Western Front (in Normandy) in August of the same year.

In many respects, the King Tiger was similar to the Panther tank, it was equipped with the same engine that was on the later Panthers, as a result, the power density per unit mass was reduced, and therefore the tank was less mobile than the Panther. At that

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While its armor was shivering from almost all the guns mounted on Allied tanks, the King Tiger was still unreliable, and its heavy weight made it difficult to move to the battlefield. Many tanks were abandoned or blown up by their crews when they ran out of fuel.

The hull of the "Tiger" P had armor with a maximum thickness of 100 mm in the frontal part. The driver was seated in front on the left, the radio operator-machine gunner was on the right. The turret had a welded structure with a maximum armor thickness of 110 mm at the front, it housed the commander, the gunner on the left, and the loader on the right. The engine compartment was at the rear of the hull. The main armament included a long-barreled 88-mm gun KzhK 43 (barrel length 71 caliber), armor-piercing projectiles of which

7 stations 1000 m pierced armor 200 mm thick. A 7.92 mm MS 34 machine gun synchronized with the cannon was installed in the turret, and another machine gun was installed in the front part of the hull.

On the basis of the Royal Tiger tank, the Jagdtigr tank destroyer armed with a 128-mm cannon, a command tank with an additional radio station, and a repair and evacuation tank were developed.
Some of the tanks were released with equipment that allows them to overcome water obstacles along the bottom. A total of 485 King Tigers were built before the end of the war.

Characteristics of R2Krÿu UI Tÿeg P Ash! B: crew - 5 people; weight - 69.7 tons; length (with gun) - 10.26 m; length

2 on the hull - 7.26 m; width - 3.75 m; height - 3.09 m; ; power plant - Mauÿasÿ NI engine. 230 R30 power + 700 hp With. (522 kW); maximum speed on the road - 38 km / h; cruising range on the road - 110 km; arm- | zhenie - 1 88-mm cannon and 2 7.92-mm machine guns; thickness ÿ of armor - 100 mm (forehead of the hull) and 110 mm (forehead of the tower).

Maiz

Already in 1941, Kgirr received an order for the development of a super-heavy tank. At the first stage of work, various variants of the machine weighing 110, |

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Mapipsh (“Mammoth”), but then, for reasons of secrecy, the works were given the designation Mats$ (“Mouse”). None of the considered options went beyond the design board, and as a result, the company came to the conclusion that it was most realistic to develop a 70-ton tank.

In May 1942, Hitler considered Krupp's reduction in tank weight to 70 tons a wrong decision and demanded that the development of super-heavy tanks be carried out even more intensively, and the weight of the tank should be increased to 120 tons. He believed that the heaviest armor and powerful guns are more important than speed. By order of Hitler, the Porsche company also began the development of a 100-ton tank, called the Rogvse-Machv (project 205).

In December 1942, Professor Porsche and Dr. Müller from Krupp reported to Hitler on the state of preparatory work for the production of the Maiv tank. It was supposed to build 150 tanks with a production rate of five tanks per month, production was to be deployed at the Krupiah factories. However, in January 1943, Hitler decided in favor of the Rogers-Mass after comparing competing designs from Krupp and Porsche. For the tank was chosen 128-mm gun, and already | In May, Hitler was shown a wooden model of the Machs tank. The construction of a prototype began on August 1 at the Alkett plant in Berlin, during the construction of the machine Krupp produced the hull and armor, Daimler-Benz produced the propulsion system, Siemens produced the transmission.

After the first prototype was already under construction, the calculated weight of the tank was increased to 150 tons, this was primarily due to Hitler's repeated wishes to install even more powerful armor, which finally reached thickness. 240 mm. But the weight in the process of construction increased even more and reached 188 tons. In order for this monster to move (and it looked more like a mobile bunker than a tank), it was necessary to solve many difficult technical problems. Professor Porsche and his team did a pretty good job, their giant was slow (20 km/h), but maneuverable enough for its size.

The power plant was traditional for Porsche, it was already used in its earlier projects - UK 3001 (R), UK 4501 (R), UK 4502 (R). 12 cylinder engine

308: "

`"Daimler-Benz" with a volume of 44.51 liters and a capacity of 1080 liters. With. drove an electric generator. The power produced by the generator was used by two electric motors that drove the tank. The main armament consisted of a 128 mm anti-aircraft gun and a 75 mm 1/44 KuK gun. The MC 31 machine gun was used for defense. In the rear part of the turret there was an additional spherical embrasure through which it was possible to shoot from a machine gun or a machine gun. The thickness of the armor was 200-240 mm at the front, 180-200 mm at the side and 160-200 mm at the rear. The fuel tank had a capacity of 3200 liters, in the rear of the hull there was an additional bang for 1000 liters. Cruising on the road was supposed to be 185 km. The chassis was 9.034 m long, with twelve double rollers on each side. The crew of the tank consisted of six people. To overcome water barriers, the tank was supposed to be laid out with equipment for underwater driving. Sea trials of the first sample began at the end of December 1943, and instead of the turret, a ballast was installed, equivalent to its weight with guns. The battle tower was was mounted on the first tank only in June 1944, the second model of the tank (with a diesel power plant) was built in February 1944. nine more samples. A 14-axle railway platform was developed by the Cra2-Simmegipv-Paskeg company (Vienna) for transporting the tank. Both experimental tanks were blown up by the Germans shortly before the end of the war at the Kummersdorf training ground. Characteristics of Maÿs: crew - 6 people; weight - 188 tons; -

length (with gun) - 10.09 m; width - 3.67 m; height -: 3.63 m; track width - 1.1 m; maximum speed on the road - 20 km / h; cruising range on the road - 185 km; armament — 1 128 mm cannon, 1 75 mm cannon and 2 7.92 mm machine guns; armor thickness - 200 mm (hull forehead) and 240 mm: (turret forehead).

E-series

At the beginning of 1943, the armaments department adopted the concept of developing new types of armored vehicles, which should not have the shortcomings of previous designs.

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with claim.

bot. In total, six main models of this series were planned: E 5, E 10, E 25, E 50, E 75 and E 100, the number in the designation indicated the weight of each tank in tons. But it was clear from the beginning that these weight classifications would be exceeded. The plan included firms that were not then engaged in the production of large-scale products, but which, in cooperation with other firms, were capable of creating new tanks. Among these firms were: A{er, Agris, Asho-Opyup, Mesegnice, and KusKner-Nitho!-Resh?.

E 5 was planned from the very beginning as a communications, reconnaissance or light personal transport. Type E 10, developed by KiosKleg-Nitajoky-Beshi2. in Ulm, was a light multi-purpose tank. The construction of the prototype was interrupted with the end of the war. Adher was responsible for the development of the E 25, which was to be used as an assault and reconnaissance tank weighing 25-28 tons, the B 50 was planned to replace the Panther tank, and the E 75 was to become the successor to the Tiger tank. Of all these projects, the project of the E 100 tank, developed by Aet. A prototype without a turret and without an engine was found by the British in Haustenbeck. After installing the engine and gearbox, the tank was transported to Yezhist,) for study.

Characteristics of E 100: weight - 150 tons; length (from scratch) - 8.6 m; width - 4.18 m; height - 3.52 m; track width — 1.1 m; engine power - 700 l. With.; maximum speed on the road - 25 km / h; armament — 1 150 mm cannon, 1 75 mm cannon and 4 7.92 mm machine guns.

With RAKr mi

At the end of the war, the aa of the tank UK 7201 (E 75), which, together with a crew of five people, weighed approximately 75 tons, was used. The chassis from the Tiger was used in its design, the possibility of installing various weapons - from 8.8- cm KUK 1/71 guns to 15 cm KUK 1/40 guns. According to the design, the length of the tank armed with the 10.5 cm KzhK 1/70 cannon was approximately 11.65 m, however, during the design process, the task was changed several times. Increased front armor from 100 to

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120 mm and the installation of a 15-cm gun KUK 1/40 increased the weight of the tank to almost 90 tons. The tank received the official designation R?2Kruu UP Gozhe (“Lion”).

Van

In June 1942, Krupp presented Hitler with a draft design for a 1,000-ton tank. On December 3, 1942, Hitler discussed this project with Speer, after which the project received the designation Kaye ("Rat"). A turret with two 28-cm naval guns 5KS / 28.- was installed on a 35 m long chassis.

Armor-piercing projectiles Rapastrgepr-vgapa (with a length of 1260 mm and a weight of 330 kg, which contained 8.1 kg of explosive) were used as ammunition.

substances (17.1 kg) were high-explosive projectiles 315 kg. At the maximum elevation angle of the barrel, the firing range could be 42.5 km. An anti-aircraft gun of 20 mm caliber was to be mounted at the rear of the tank. The tank had the following overall dimensions: length (with guns) - 39 m; width - 14 m and height - 11 m. The power plant consisted of all Daimler-Benz engines used on torpedo boats and developing a total power of 16 thousand liters. With. 3

Projects of promising armored vehicles In the German documentation, which was closed by the allies, there were sketches of promising tanks with the designations P2Kre» UIN, P2Krem IX and P2Krek X. There is no data on these projects, only the characteristic (tortoise-like) shape of the tanks can be noted . ` A preliminary design of a 1500-ton self-propelled gun with an 80-cm Roga gun was also developed. As two turrets with a 15 cm additional weapons on it consisted of four cannon in each. Power; such an installation was envisaged - self-propelled guns diesel ones; submarine engines.

Zharasada

27. TANK DESTROYERS

Tank destroyers were a specific weapon of the Second World War. Although they often used the same chassis as the tanks and even looked similar at times, they differed markedly in their combat use. Tanks—with their combination of firepower, mobility, and armor—usually had an advantage over ist. tank destroyers with their limited ability to move and relatively thin armor. However, the fighter usually had more powerful weapons and a low silhouette, which gave him the opportunity to take cover. Towards the end of the war, Germany focused its attention on creating more and more tank destroyers, since by that time the German army was on the defensive, and these more

- vvv funds were cheaper than tanks like "Panther" and "Tiger". Among all the types of tank destroyers created during the war, the allies noted Heirer and Yard

7 rarÿeg.

"Hetzer")

In order to replace the tall and clumsy Marder PI tank destroyers in 1943, a decision was made to develop a light fighter (Rapgetzadeg) on the chassis of the RaKrem 38 (1) tank. As a result of the development, one of the best German tank destroyers Gardraogeg 38 (1) was created with a 7.5 cm Pak 39 anti-tank gun; he also had the name "Hetzer" (Nezher - pursuer). "Hetzer"

used the main engine and the main part of the RaKrbu 38 (1) tank in combination with a new armored hull, which had an inward slope. It was manned by a crew of four, armed with a 7.5 cm Pak 39 cannon modified for this vehicle and an additional machine gun. Production of the Hetzer began in Prague at the end of 1943, after which factories in Pilsen, Königgratz, Böhm and Breslau were connected to production.

These factories were soon fully loaded, as the Hetzer proved to be a very successful combination of gun and chassis; The tank destroyer was small and low, well protected and moved very well over rough terrain. Its gun could knock out any vehicle, except for very heavy tanks, while the Hetzer itself was very difficult to knock out, since

- in battle, he was so small that he was hardly found

bring down the opponents. More and more applications for it came from the front, therefore, by the end of 1944, the entire production of R? KrbBu 38 (1) tanks was adapted for Hetzer. A total of 1577 vehicles were built, of which some of the Hetners were produced in the version of the flamethrower tank Mapitralgeg 38 (6) and the version of the repair and recovery vehicle Vegrerapgeg 38 (0.

Characteristics of "Hetzer": crew - 4 people; weight - 14.5 tons; length (with gun) - 6.2 m; hull length - 4.8 m; width - 2.5 m; height - 2.1 m; power plant - Rtaga AS / 2800 engine with a capacity of 150-160 liters. With. (111.9 - 119.3 kW); maximum speed on the road - 39 km / h; travel distance - 250 km; armament — 7.5 cm Pak 39 anti-tank gun; armor thickness - 60 mm (forehead of the hull and cabin).

Zaadraltag ÿM Combat experience gained during the campaigns of 1942 showed the German command that self-propelled guns

: lucky PI should be re-armed if there are any

use as tank destroyers. Initially, it was planned to equip them with a 7.5 cm gun mounted on the Panther tank. However, this gun was 70 calibers long;

required significant improvements, so it was decided to adapt the chassis of the R2Kryu GU tank for these purposes.

As a result of design studies in October 1943, Wardrapgeg GU Aiz appeared! E with a 7.5 cm Pak 39 or Rapgetsaret 39 cannon. But by the time the first samples appeared, a long gun of 7.5 cm caliber was already reserved for the Panther tanks, so that only the first samples of the Tardrahget GU received a long gun, and subsequent ones - a 48-caliber gun.

Yardrapleg [U] had a low hull with a rational inclination of the frontal and side armor, the gun was mounted in front. The boss compartment and the control compartment were located in the front of the hull, the power plant was in the rear. To enhance the armor protection of the sides, additional screens were installed; The low silhouette and well-protected hull of this tank destroyer were positively appreciated by the troops, so that there was a great demand for the Jardrapheg GU very soon. The gun was powerful enough to counteract any enemy tanks. For the period 1943-1944. built more than 800 machines of this modification, most of which operated on the Eastern Front. :

Although the command of the armored forces believed that the Waddralheg 1U was good enough in its original form and did not require any modernization, Hitler categorically insisted on replacing the armament of the tank with a longer gun. Thus, from August 1944, Tardrapleg GU/70 began to appear, equipped with a -7.5-cm gun 5ik 42 with a length of 70 calibers. In combat, this gun proved to be a powerful tank killer, penetrating 160 mm thick armor at a distance of 1004 m. However, the additional weight of the long gun. guns overburdened the car to such an extent that it was necessary to strengthen the front wheels. The additional weight of the gun also reduced maneuverability and speed along the crossing.

. chennoy area. The upgraded version of the tank destroyer was produced until March 1945, a total of 930 vehicles of this version were built. :

Characteristics of Yardrapeg Gee: crew - 4 people; weight - 25.8 tons; length - 8.58 m; width - 2.93 and; height - 1.96 m; power plant - Maubas NE engine, 120 power

265 i. With. (197 kW); maximum speed on the road --- 35 km/h; power reserve - 214 km; armament - 7.5 cm gun Zi 42 and two 7.92 mm machine guns MO 34 or MO 42; armor thickness - 80 mm (forehead

hulls and cabins).

Nazvot

Due to the lack of anti-tank weapons in 1942, it was decided to adapt. under the 8.8-cm anti-tank gun Pak 43 self-propelled artillery mount Sezshigzharep Sh / TU, based on the chassis of the R2Krem TU tank using some components of the chassis of the RaKrbu Sh tank. This is how an anti-tank self-propelled gun called Mazhogp ("Rhinoceros"), which was one of the projects of the so-called "interim period". The first samples of the new self-propelled guns of the Mazvogi installations, for which the designation Nogpÿsÿe ("Hornet") was sometimes still used, were released in 1943.

The conning tower with the gun was installed in the rear part of the hull, the armor of the cabin in front and on the sides was relatively thin, and the top and rear were open. The gun was mounted quite high, so in close combat Mazhogn was a good target for enemy tanks, in addition, the pursuit of tanks was very difficult for him, since the undercarriage was designed for a lighter vehicle. With this in mind, the Maghorn was often used as a fixed gun, which was able to use the considerable power and accuracy of its cannon to hit targets at ranges of up to 2,000 meters or more. Most other types of tank destroyers fought at shorter ranges.

The crew of the "Rhino" consisted of five people, while only the driver was completely under armor protection. The rest of the team was in an open conning tower covered with canvas to protect them from shards. Most of the 40 shells were placed in lockers on the sides of the cabin, the shooter's station was equipped not only with a conventional sight for direct fire, but also with a long-range sight. In the last stages of

The production of the Pak 43 gun was replaced by the Pak 43/41 gun. The Rhinoceros had a machine gun for defense, and the crew was equipped with at least two more machine guns. The production of most "Rhinos" was concentrated in Reshÿsÿe Bisepmegke in Teplitz-Schönau and Duisburg, in total, 473 copies were built before the end of the war. Characteristics of Mazyog: crew - 5 people; weight - 24.4 tons; length: - 8.44 m; width - 2.86 m; height - 2.65 m; power plant - engine Mauhashy NI, 120 with a capacity of 265 liters. With. (197 kW); maximum speed on the road - 40 km / h; power reserve - 210 km; armament — 8.8 cm Pak 43/1 anti-tank gun and 7.92 mm machine gun; thickness. armor - 30 mm (hull forehead) and 10 mm (cabin).

"Elephant" A

By the time the Henschel tank project went into production under the designation ÿ2ÿÿÿÿ ÿÿ "Tiger", it was decided to launch an alternative project of the company: "Porsche" to put into production as a heavy tank destroyer, installing 8.8 - see Pak 43/2 anti-tank gun. A total of 90 machines were manufactured under the designation P278 Tiveg (P), later they became known as "Ferdinand" or Biegam ("Elephant"): Index (P) denoted Rogvse.

Production of the Elephants (Biegam) began at the Meschpruegke plant in early 1943, the urgency of starting production was explained by the fact that Hitler demanded that these tank destroyers be ready for the main campaign of 1943, the Battle of Kursk. For the Elefants, which were in service with two battalions of the 654th Tank Regiment, the battle near Kursk was a terrible baptism of fire. Even before the start of hostilities, accidents began. many "Elephants" broke down as soon as they started to move. Those who did this at the Soviet defensive lines were left defenseless, because the vehicle, equipped with the most powerful anti-tank gun for that time, did not have defensive small arms. The crews of the Elefants, having no way to protect their vehicles, abandoned them and fled. The same machines that survived under

Kursk, were later equipped with machine guns for defense. They were soon transferred to other fronts, such as Italy, but even there their unreliability and lack of spare parts soon rendered them useless.

Characteristics of ÿÿÿÿÿÿÿ: crew - 6 people; weight - 65 tons; - length - 8.13 m; width - 3.38 m; height - 3 m; power plant - two Mauhashy NI, 120 TKM engines with a power of 530 hp each. With. (395.2 kW); maximum speed on the road - 20.1 km / h; hallway - 153 km; armament - 8.8 cm anti-tank gun Cancer 43/2 and 7.92 mm machine gun; armor thickness - 200 mm (forehead of the hull and cabin).

Zaddratteg - For the first time, the question of creating the Jagdpanther TENE was discussed at the beginning of 1943, when the demand for tank destroyers increased greatly. The prototype, then called the P2)e Panther, was shown to Hitler in October 1943, and it was Hitler who ordered that the name of the machine be changed to the Yatdpanther. In February 1944, the first serial samples of the Jagdpanther left the shop. The spacious, turretless hull of the vehicle had an optimal inclination of the armor plates, using

the chassis from the Panther tank fell. An 8.8 cm Pak 43 anti-tank gun was supplied as armament and a 7.92 mm MS 34 or MS 42 machine gun was installed. New

. the tank destroyer acted on the battlefield enough

. successful, he was fast, well protected and had a powerful gun. To overcome water obstacles, he was supplied with equipment for underwater driving,

The German command planned to increase the production of the Jagdpanther to 150 machines per month. However, by April 1945, only 382 vehicles had been produced. The main reason for this low productivity was the destruction and damage to the MJAO plants in Braunschweig and the Bländer Evepoetk Kirstöger in Brandenburg caused by Allied bombing. These destructions

- led to the fact that by the end of the war there were several varieties of the Jagdpanther. It was also planned to produce a new version of the vehicle with a 12.8 cm anti-tank
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tool.

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Characteristics of the "Jagdpanther": crew - 5 people; weight - 46 tons; length - 9.9 m; width - 3.27 m; height - 2.72 m; power plant — Mauhashy NI, 230 engine with a power of 600—700 hp. With. (447.4-522 kW); maximum speed on the road - 55.0 km / h; power reserve - 160 km; armament - 8.8 cm anti-tank gun Cancer 43 and 7.92 mm machine gun; armor thickness - 80 mm (forehead of the hull and cabin).

"Jagdtiger"

By 1943, the following order had developed in the development of German armored vehicles:
as soon as a new tank project was developed, a version of the tank was to be produced immediately.

"with a fixed turret and a gun with a limited horizontal angle of rotation. Thus, when the massive "Tiger" P, or "King Tiger" appeared, the development of the corresponding tank destroyer began.

A prototype of this super-heavy tank destroyer appeared in October 1943, and production began in 1944 under the designation P?21p Pres Aos B, better known as the Jagdtigr (Jariiiireg). It was the heaviest vehicle in its class with the most powerful World War II armor. It had an initial weight of at least 70 tons, but over time, after some modifications, its weight increased to 76 tons. Most of this weight

referred to armor that was at least 250 mm in front, the 12.8 cm Pak 44 anti-tank gun was originally used as a weapon, but it was later replaced by a similar Pak 80 gun. These guns were the most powerful anti-tank guns in during the war, and the large size of its ammunition meant that each Jagdtiger could only carry about 40 rounds. The defensive armament consisted of two 7.92 mm machine guns.

However, the mobility of the Jagdtigr left much to be desired. It was equipped with the same engine as the Jagdpanther, but this engine had to carry a much larger weight of the Jagdtiger, while significantly increasing fuel consumption and reducing the range. When driving over rough terrain, the Jagdtigr had a speed of only 14.5 km / h, and often less, the maximum

the possible cruising range over rough terrain did not exceed 120 km. The line for the "Jagdtigers" was organized at the plant of the Meschpruetk company. By the end of the war, only 77 vehicles had been produced, due to the destruction caused by the Allied bombing, not only in tank factories, but also in the supply lines of raw materials. By the time the war ended, two types of Jagdtiger could be encountered, produced by Henschel and Porsche. In both versions, the machines were overweight and suffered from a lack of power of the power plant. 7 reed, Characteristics of "Yagdgigr": crew - 6 people; weight - 76 tons; length - 10.65 m; width - 3.63 m; height - 2.95 m; power plant - Mauÿasÿ NI engine. 230 with a capacity of 600-700 liters. With. (447.4--522 kW); maximum speed on the road - 34.6 km / h; power reserve - 170: km; armament - 12.8 cm anti-tank gun Rak 44 and 7.92 mm machine gun - met; armor thickness - 150 mm (hull forehead) and 250 mm (forehead

felling).

28. SPECIAL TANKS

Flamethrower tanks

In 1941, after preliminary tests on the basis of the R2Krem E light tank, a flamethrower tank was created under the designation Napitrappeg I (BIR 1), in which a Napipeprapgeg 40 flamethrower was installed in the turret instead of one of the machine guns. - German corps in North Africa. Soon the Napitrapgeg TI was put into service, created on the basis of the RKrÿm I Atse G or E tank. It had two flamethrowers, one on the left and one on the right in the front of the hull. Each flamethrower had a range of approximately 36.5 m. GIR? P was built in small numbers, almost all of them were used on the Eastern Front.

The most numerous was the Napipraptegg Sh, based on the R/Krbu Sh Aos# N or M tank. to the fullest extent, blatantly, because of their inability to defend themselves against enemy tanks, so whenever they were used in combat, they had to be covered by other tanks.

There were plans to convert part of the Panther and Tiger P tanks into flamethrowers, but they were not implemented. Instead, in 1944, the small Napiprapheg 38 (0) was adopted as the standard infantry flamethrower tank, which used the squat hull of the Hetzer tank destroyer. The flamethrower took the place of the gun, and part of the interior was given over to tanks for combustible mixture.

For most of the war, the German army used the ZK 251/16 half-track armored personnel carrier as a flamethrower. This machine, designated Nattrapgegmarep, carried two tanks of 700 liters of combustible mixture, which was enough to create 80 two-second flashes of flame. Each tank fed its own flamethrower, which were located on the sides of the car, but some

the cars had a third, changing flamethrower in front. The typical range of these flamethrowers was approximately 35 m.

Vegderapÿÿeg

At the beginning of the war, the German army used 18-ton ZAK 9/1 and 9/2 half-track tractors to evacuate broken or damaged tanks from the battlefield. However, with the advent of heavy tanks such as "Titer" and "Panther", these tractors could only be effectively used by tanks. demo for pulling one tank. The only solution was to create a new heavy tractor based on the early models of the Titr tank. Instead of a cannon, a powerful winch was installed in the tower, but soon from this. This option was abandoned, since the Tigers were in short supply and were always required to replace failed tanks.

In the end, it was decided to use the hull of the Panther tank as the basis for a new recovery tank, called 54ÿÿ 179 Vegveratÿÿÿr or VtvRg Rapÿÿeg. The first Wegrerapineg appeared in 1943, at. In the conversion of early models of tanks, the bashia and the combat compartment were completely removed and replaced with an open upper part of the structures, which housed a powerful winch. The vehicle had a massive spade-shaped device at the back, which was used as a stopper when pulling out damaged tanks with a winch. Vegrerapiger also carried a light girder crane on the port side, which was used for maintenance work.

In the spring of 1944, the machines were modified by REMAS in Berlin. By the time the war ended, 297 vehicles had been built, but not all of them were fully equipped due to shortages of individual units. For example, some cars were produced without rear--

Sh M. and V. Kozyrev 321

th locking device, which reduced their capabilities to the capabilities of a conventional tractor. Winches were removed from many of these incomplete vehicles, and the freed space was used to transport ammunition and ammunition.

The Vegverapiger proved invaluable on the battlefield, and it is not surprising that these vehicles were concentrated in tank regiments equipped with Panthers, Tigers and

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"Royal Tigers". The vehicle was serviced by a crew of five, with a 7.92 mm machine gun in front of the hull. At the end of the war, many vehicles were equipped with a 20-mm gun on a turret, from which it was possible to fire at aircraft or at ground targets.

Characteristics Vegrerapÿÿeg: crew - 5 people; weight - 42 tons; length - 8.15 m; width - 3.28 m; height - 2.74 m; power plant — Maubas NI 210 R.30 engine with a capacity of 642 hp. With. {478.7 kW); maximum speed on the road - 32 km / h; cruising range - 169 km; armament - 20 mm cannon and 7.92 mm machine gun.

Mypoprapheg

When the designers developed a massive. siege howitzer "Karl", they mounted it on a large tracked chassis to provide some degree of mobility, but they forgot about the issue of supplying ammunition. This oversight soon became clear, so it was planned to develop a special ammunition carrier delivering concrete-piercing shells to Karl, each of which weighed 2170 kg and had a caliber of 60 cm. , became the R2Krbg GU Ajie Ye tank. The turret was removed from the tank, and instead a platform was mounted along the entire length of the chassis. In front of the platform, a crane with a lifting capacity of 3,000 kg was installed, the boom of which, in the stowed state, was laid horizontally towards the rear of the hull. The platform itself was used to place the transported shells on it.

The main part of the path of the self-propelled gun "Karl" and its service equipment had to be carried out along

railroads, so the carrying train included several platforms to carry Mipoprapgeg. All this was located close enough to the combat position of the self-propelled howitzer. The shells for the gun were taken from the freight cars of the train using a crane mounted on a conveyor. The transporter then moved to the firing position and unloaded shells next to the self-propelled gun, and was also used to load the gun. For loading and unloading shells on a crane, special grips were used. At the combat position, one self-propelled howitzer was served by two March.

However, not all movements of "Karl" were carried out by rail. In some cases, it was dismantled into separate units for transportation on dirt roads, but this was a long and difficult process, after which the howitzer was also assembled at the place of arrival for a long time. In these cases, MipiNolrapeg was transported on special wheeled trailers towed by large half-tracks.

Characteristics of Mipÿÿoprappeg: crew - 4 people; weight - 25 tons; length - 5.41 m; width - 2.88 m; power plant — Maubas NT engine. 120 TEM with a capacity of 300 hp With. (223.7 kW); maximum speed on the road - 39.9 km / h; cruising range - 209 km.

$9KY 265

The concept of tank warfare provided that unit commanders had to move forward with their tanks and always maintain contact with them. It was assumed that the best way to do this would be to find commanders in tanks. But on the other hand, the commanders had to have with them all the special equipment and additional personnel who helped the commander in carrying out his task. Thus, a specific form of command tank was required.

In typical German style, the designers came up with an answer already in 1938. It was decided to convert the small training tank P2Kru | commander, and as a result, ZAK 265 Kleteg RapgefeeShuuarep (ma-

light armored command vehicle) whose rotating turret was replaced by a conning tower to provide additional space inside. The crew was increased from two people (at the tank) to three - a commander, a Swazi assistant and a driver. An additional interior space was equipped with a small table for the commander, on which he had to work with maps. In addition to the table, there was a cabinet for storing a large number of maps and other documents and two radio stations - one to keep in touch with their tanks, and the other to keep in touch with the higher command. These radios required the addition of a dynamo, which generated power for them and kept the batteries charged. As a defensive arm. A 7.92 mm MO 34 machine gun was installed in front of the front.

In total, three versions of this command vehicle were built, one of them had a small rotating turret on top. However, this variant was discontinued soon after, because the turret traverse mechanism was too restrictive in terms of interior space. The other two variants differed only in individual details, in all of them, due to the small size of the vehicle, it was very crowded. But the concept worked very well, and approximately 200 converted Rukru 1 tanks were produced. The first of them took part in the Polish campaign of 1939, many tanks were used in France in May-June 1940. Later they were equipped with the German Expeditionary Force Aya Cogrs. Despite

relative success in the command role, the modification of the small tank P2Crew E was indeed too small and cramped to work effectively, so it was later replaced by large tanks converted for this purpose.

Characteristics 54 Ki? 265: crew - 3 people; weight - 5.8 tons; length - 4.45 m; width - 2.08 m; height 1.72 m; power plant — Maugasch MT, 38 engine with a capacity of 100 hp. With. (74.6 kW); maximum speed on the road - 40 km / h; power reserve - 290 km; armament - two 7.92 mm machine guns; armor thickness - 13 mm (hull forehead). 5

29. AMPHIBIANS

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In 1936, Rheinmetall received an order to develop a special tractor that could be used in landing operations. The idea was that the tractor should be able to tow on water and on land behind itself an amphibious trailer capable of carrying loads weighing up to 18 tons.

Rheinmetall developed an amphibious caterpillar tractor called EUU5 (Gapa-Mnasseg Sszherreg). 1 \ / $ took on board, in addition to the three crew members, another 20 people. At the rear of the tractor there were two propellers for driving on water, portholes were inserted in the cabin walls to provide a view when driving the machine on the water. The floating trailer was a large three-axle platform (one axle in front and two axles in the rear), it moved on wheels on the ground. At the rear of the platform there was a ramp that could go down for loading or unloading, a typical load was an 18-ton tractor 54KEg 9, whose crew, when crossing water barriers, moved into the cab 145. ;

Testing of the E/3 and the trailer proceeded rather slowly until, in May-June 1940, they began to prepare for Operation 5ezhe. Since the 1\$ and the trailer were originally intended to overcome inland water obstacles, which are much calmer than the English Channel, the tests continued in the open sea. However, due to the cancellation of the Seeome operation, work was also stopped on No., one of the additional reasons for the termination.

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- work was also the fact that the car was unarmoured. I

Soon an armored modification No. 5 was developed based on the chassis of the R2Kr TU tank. It was assumed that two such machines, designated Rapteg-Tane, or P? E, should carry between them a large pontoon with a tank or some other load on it. Thus, P2E was more of a ferry than a tractor. However, after two prototypes of the P2E were built and tested, the project was abandoned in 1942. At the end of the war, the ÿM was captured by British troops, after which it was brought to England for a comprehensive technical evaluation.

Characteristics 1 No.: crew - 3 people, number of passengers - 20, weight - 13 tons; diaina - 8.6 m; width - 3.16 m; height - 3.13 m; power plant - Maurashi NI engine. 120 TEM with a capacity of 265 liters. With. (197.6 kW); maximum speed on the road - 40 km / h, speed

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on the water - 12.5 km / h; cruising range - 240 km.

Beÿugÿgtÿgodep E:

In 1940, an amphibious version of the car was developed under the name Bspushshtikavep (full name Zsvushiiaivveg Seÿapdepr Tour 166). The car was originally intended for use by airborne units; (military version of the Volkswagen car).

Espunpipmarep was equipped with a gasoline engine. 1.3 liter mom, which provided the car with fairly good performance. Special tires were used for cross-country driving. The car, in addition to the driver, accommodated three more people, there was a screw at the back of the body to ensure movement through the water. The screw was located on a hinged suspension, when moving the car along the ground, it went up, and before entering the car into the water, it lowered

-calsa to working position. Management on the water was carried out with the help of the front wheels.

A production line for the production of cars was organized at the Volkswagen plant in Wolfsburg.

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This plant was often bombed by allied aircraft, and by the end of 1944 the assembly line was stopped due to lack of raw materials. Behmipityaarep was widely used in reconnaissance units, in addition, it was used by command personnel of all levels as a vehicle for visiting randomly scattered units, especially in large areas of the Eastern Front. Many of the models used on the Eastern Front were equipped with an additional tank containing a special mixture for starting the engine in winter conditions. At the end of the war, most of the built machines were used mainly on the Eastern Front. The total number of cars produced during the war years reached 14,625 copies. Characteristics Zspitipuarel: crew - 1 person; number of passengers — 3; weight - 903 kg; payload weight — 434 kg; length - 3.83 m; width - 1.48 m; height - 1.62 m; power plant - engine "MU with a capacity of 25 liters. With. (18.64 kW); maximum speed on the road - 80 km / h; speed on water - 11 km / h; cruising range - 450 km.

"30. HALF-TRACK VEHICLES

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In 1941, a special vehicle 59K # 2 Keshez Kenepgad was put into service (54K17 means Sopiegktaÿmarep, and Kisipez Kepepgay means a small wheeled-caterpillar vehicle). This vehicle was originally intended for use by airborne troops as a very light tractor for the 3.7 cm Pak 35/36 anti-tank gun (landing version), as well as guns that were designed for use by airborne troops.

special purpose.

The first production model was car No. 0-101, which could carry three people, including the driver. The car had a tracked chassis and a front steering wheel, the engine was located below and behind the driver. Two people could sit in the back of the car facing backwards, and the equipment that needed to be transported was hitched at the back. In addition to light guns, the machine could also tow a specially designed light trailer with ammunition or fuel, if necessary, the passenger seat was removed to free up additional space for cargo.

The 54K® 2 vehicles were intensively used by the paratroopers on the island of Crete. After the paratroopers began to fight along with the infantry, the need for these light tractors disappeared. Therefore, Keyepgay was mainly used as a supply vehicle for detachments fighting in areas where other vehicles could hardly move. Nebolina

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Kenepgad could move on clay soil or sand, towing a load weighing 450 kg. Relatively few machines were built, so the few that were available were usually reserved for difficult missions. R 5

Soon, a second model of the machine with increased dimensions was proposed, known as the NK102. She had a 2 liter engine (M5B-101 had a volume of 1.5 liters) and could carry five people or a load of equivalent weight. However, NK102 did not go beyond the design stage, since in 1944, they came to the conclusion that Keyeptai is. a luxury that the German armed forces could no longer afford. The production of vehicles ceased, although those that were in service in 1944 served until the end of the war and were used as a vehicle for signalmen. One version of the machine (54ÿÿ 2/1) was intended for laying a telephone cable, and the second ($ÿÿÿ 2/2) - for laying electric power cables. Both versions had cages installed at the rear of the machine for cable drums and devices for laying cables on the ground.

Characteristics 54K? g 2: crew - | people; number of passengers - 2; weight - 1200 kg; payload weight - 450 kg; length - 2.74 m; width - 1 m; height - 1.01 m;

; power plant - engine Oreÿ-Oÿutria 38 power

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tew 36 l. With. (26.8 kW); the maximum speed on the road is 80 km/h.

Sak 251

The medium armored personnel carrier $CHK{2 251 was developed in 1937 by the Napotar firm (Hannover) for transporting personnel; it could accommodate 12 fully equipped infantrymen. The ZAK 251 was a hybrid design: the hull and upper part of the vehicle were manufactured by Vissipr-MAS, all mounted on the chassis of a $9K 11 half-track tractor used to transport ammunition.

The first serial samples of the HAK version? 251/1 entered the 1st armored division in early 1939, and it was this version that was produced in large numbers. Armed

Armed with at least two 54KE 251/1 machine guns, it was a very useful combat vehicle capable of keeping up with rapidly advancing tank units. At least four versions differing in the shape of the hulls were produced, the thickness of the armor in various places of the hull ranged from 6 to 14.5 mm.

There were at least 22 specialized versions of the armored personnel carrier. These included: ambulances, artillery surveillance, command and communications (radio and telephone) versions, versions with infrared searchlights or anti-aircraft weapons, and even a tank destroyer version with a 75 mm anti-tank gun.

But the most powerful of all the variants of the machines was the version 54K1ÿ 251/1, known as Zshka it Kivv (“Infantry diver”). It was an armored personnel carrier with six launch frames for 28 cm or 32 cm rockets (three frames on each side), fired from a short distance at fixed or area targets. It was powerful. This weapon was especially suitable for street fighting, but another variant, the ZAKE 251/9, armed with a short 75 mm tank gun, was a much more accurate weapon. There was even a version of a flamethrower (54K& 251/16) and a mobile anti-aircraft installation against low-flying targets (ÿ4ÿÿ 251/21) with three (15 mm or 20 mm) MO 151 aircraft guns. The Owl carried an infrared searchlight to illuminate targets for small groups of tanks. cove "Panther" at night. It began to be produced at the end of the war and was used mainly on the Eastern Front.

ZAKE 251 - in all its variants was produced in thousands of copies, it was used on all fronts, usually in close cooperation with tanks.

Characteristics $8Kb 251: crew - 1 person; number of passengers - 12; weight - 7810 kt; length - 5.8 m; width - 2.1 m; height - 1.75 m; power plant - Maukazh NI engine. 42 with a capacity of 100 liters. With. {74.6 kW); maximum speed on the road - 52.5 km / h; power reserve - 300 km.

31. REMOTE-CONTROLLED WEDGES

One of the first remotely controlled vehicles intended for combat use was developed in 1918 by the Englishman E. Wychersham, an engineer of the CarterCharm Trace: org company. This apparatus, called [api Togredo ("Land torpedo"), was a carrier of an explosive charge. The engine of the device was powered by a battery, control was carried out by cable. Although the apparatus had certain advantages in the defensive operations of the First World War, it never saw combat.

Development of vehicles with remote control

control towing explosive charges was carried out in Germany in 1939–1940. Experimental charge carriers with remote control were also developed in France in 1939, in England in 1940, and towards the end of World War II in the United States. Although other countries have experimented with tele- and radio-controlled unmanned ground vehicles, Germany was the first country to start commercializing these systems.

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The German army, having conquered Poland, was faced with the need to quickly clear passages in minefields. The high command of the army leaned in favor of the use of a remote control vehicle. In November 1939, the Vogrzagi firm received an assignment to develop a remote-controlled tracked vehicle.

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The first model of the machine was created by the time of the battle for France in mass 1940. It was 54K 300 Mi-peppapshpimarep, of which 50 copies were built from 1939 to May 1940. The machine, which received the designation B I in the company, weighed 1.5 tons, was equipped with a 4-cylinder | 1.5 liter engine with 29 hp. s., the speed of movement was 5 km/h. The operator directed the tankette to the area that was supposed to be cleared. In the right place, the device installed an explosive charge, activated the delayed action fuse and left. However, the deceleration device often failed, leading to the destruction of the carrier apparatus by a premature explosion.

In April 1940, a new version was ordered under the designation V P. It was a more advanced apparatus, weighing 2.3 tons, equipped with a 6-cylinder engine with a volume of 2.25 liters and a power of 49 hp. With. The production of a batch of 100 copies of the VP was supposed to begin in July 1940. However, only two prototypes were made, which underwent military tests in one of the engineer battalions. An amphibious version of the apparatus was also developed, known under the designation Epie (“Duck”) and built in a single copy. These devices were controlled from an armored car $ AKYO 265.

Due to the lack of remotely controlled tankettes during the invasion of France in 1940, a new method of clearing fields and blowing up bunkers was practiced using light tanks RaKrghi !V. For these Neley. 10 tanks were modified, which were equipped with special equipment to accommodate a dropped explosive charge. The German command found this very interesting and ordered the development of a vehicle for special purposes. In October 1941, the Vogvmag firm was ordered, taking into account the experience of creating the VGiVP, to develop a heavy apparatus VGU.

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Apparatus V [U (59KE 301) weighed 3.5 tons and was equipped with a Vogruar4-Moot engine with a power of 49 liters. With. It had the following dimensions: length 3.65 m; width 1.8 m and height

1.19 m, carried 500 kg of explosive. A fuel reserve of 130 liters gave a cruising range of approximately 120 km. The driver delivered the device, which could move at a maximum speed of 38 km / h, to a given place. After that, he lowered the armored panels to protect the equipment from the consequences of demining and then controlled the device by radio from a distance of approximately 800-1000 m, while the maximum control range was 2 thousand m. it was necessary to de-mine. After being freed from the load, the apparatus returned back to the driver. The plate of the vehicle, it was dropped remotely from the device dropped charge exploded with a certain delay, detonating nearby mines. Then the next apparatus was sent to the cleared zone, this process continued until a passage was formed in the minefield. The vehicle could also be used against fortifications and against fixed or slow-moving targets. And In April 1942, 12 experimental devices were built. Serial production began in May, it was supposed to build 3451 devices. By June 1943, 616 vehicles were ready for the TUA, by November - 260 for the GUV, and approximately 305 for the GUS were built from December 1943 to September 1944. The cost of a serial tank was 28 thousand rubles. Reichsmark. Option B only slightly differed from option A: it weighed 400 kg more, the location of the radio antenna was changed and improved radio equipment was installed. At least one B GUV was converted into an amphibious version and tested on the water. The last modification of the apparatus in the GUS was the largest - 4.1 m long, 1.83 m ketki wide and 1.25 m high. The device was equipped with a 6-cylinder engine with a volume of 3.75 liters and a power of 78 liters. with., developed a speed of up to 40 km / h. The thickness of the armor was increased to 20 mm, which resulted in a total weight of about 5 tons. In 1943, one of the samples V [U] was equipped with a TV camera. The apparatus was monitored from the control tank using a television screen. The Vogemagd vehicles were in service with the Rip epk (EY) engineer battalions, where they were first used together with the R2Krem Sh tanks as mobile

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control points, and later with ZS Sh Ash E / O. After 1943, V TUs were used in armored units along with Tigers (14 Tigers accounted for 45 V GUs). Four sapper battalions with VIV for the first time took part in the Battle of Kursk.

At the beginning of 1945, the Germans needed a light tank destroyer for street fighting in the defended cities, but there was no time to develop new weapons. Then they began to experiment with a launcher with six 88-mm Kake (eprapgetfisive 54/1) rocket-propelled grenade launchers, capable of penetrating 220-mm armor at a distance of up to 200 m, placing it on a wheeled or tracked vehicle. Kifegarep was used, and caterpillar vehicles were used a light tank RgKr | and a captured French tractor Kepashi Che. However, the most attractive for this purpose were wedges V TU, 318 copies of which were in warehouses, another 79 copies were in service. Approximately 56 vehicles: In the GU were converted into tank destroyers apge ("Bedbug").

Machines of different versions were finalized in various ways. For example, the version B vehicle received an additional place for the gunner to the left of the driver, protected in front by an armored plate. The launcher was mounted to the left of the shooter;

, armored sheet to protect the shooter during missile launches. The C version car was redesigned in the same way, except that the driver's seat was located

left. All Uuapge machines had a smoke screen device in front, which played an important role. During the attack, the tank destroyer rolled out from the corner of the house into the street for direct fire, then quickly took aim, fired at the enemy and immediately put up a smoke screen. Under the cover of the curtain, the tankette rolled back under the cover of the house. In the event of a successful return, it was possible to reload the rocket launcher for a new attack. In April 1945, an experimental tank destroyer unit as part of the SS Nordland armored division operated in Berlin against the Soviet troops. It was armed with Kiÿeÿgarep and VGU vehicles.

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"Goliath. In 1940, the Germans recovered from the bottom of the Seine and restored a small remote-controlled apparatus developed by the French company Kerguezse. The apparatus was handed over for study to the Borgvard company, and already in November the company received an order to develop a small remote-controlled tanker, which should carry at least 50 kg of explosive. The idea was to use this machine to destroy enemy bunkers, fortified positions and even tanks from a safe distance. It was assumed that after detecting enemy positions, the operator, sitting in a safe position, would direct the apparatus using remote control to the desired point and undermine it. The device was named Hesscheg Gaizprsÿgaveg (light explosive carrier) 54KE 302 "Goliath" (Owl! E) or Sega! 67. Two Vozen MM / KOI electric motors were used as a power plant. 2500/24 KI.2 with a power of 2.5 kW each. Two batteries provided energy for the engines. The total weight of the device reached 370 kg, while it developed maximum speed. 10 km/h The power reserve of the apparatus was 1.5 km on the road - and 800 m over rough terrain. For longer ones. transportation, a two-wheeled cart was used, - on which the Goliath was delivered to the area of its application. At the rear of the apparatus was a drum that carried a three-wire cable. Two wires were used to control the apparatus and one to detonate a charge weighing 60 kg. "Goliath" was 1.5 m long, 0.85 m wide and 0.56 m high, its body was made of 5 mm steel. The caterpillars had a width of 16 cm, the device could overcome trenches 60 cm wide. - From April 1942, the serial delivery of Goliaths began, but the cost of the device, according to the armament department, was too high - 3 thousand Reichsmarks. Therefore, already in November 1942, a decision was made. to start production of vehicles with an internal combustion engine — ZAK 303 (“Goliath”/U). The production of electric "Goliaths" was supposed to be curtailed only when the production of "Goliaths" / U reaches 500 devices per month. Last 69 units out of 2650 built

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electric Goliaths were delivered in January 1944.

The first version of "Goliath" / W. ($4K{» 303a/Setakh 671) was built from April 1943 to September 1944 in the amount of 4604 vehicles. The device of this version could carry 75 kg of explosives. 2-cylinder engine 21p4arr 527 with a volume of 703 cm? had a capacity of 12.5 liters. With. and allowed the 370-kt vehicle to develop a speed of 10 km/h. The petrol tank was located in the rear part of the hull and had a capacity of 6 liters, which made it possible to have a maximum cruising range of 12 km on the road or 6-8 km over rough terrain. The body of the apparatus was made of 19-we steel, it had a length of 1.62 m, a width of 0.84 m and a height of 0.6 m, the engine air intake was located on top.

The second version, 59K 303b/Segat 672, was built from November 1944, and 325 devices were produced in total. This version could carry 100 kg load, it differed from the version

- "a" sizes. The length was now 1.63 m, width 0.91 m and height 0.62 m. Despite the increase in weight to 430 kg, the device could reach a speed of 11.5 km / h with the same engine. Was the other technical data the same as for ZAK? 303a. The charge was placed in front of the hull, while the engine was located in the middle compartment. In the rear part of the hull there was a drum that carried 650 m of wire, and a gas tank was also located there. The ZK 303a apparatus could overcome trenches 85 cm wide, and ZAK 303b even trenches 1 m wide, both could

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overcome a slope of 70°. The price of the Goliath/U was only a little over 1000 Reichsmarks, but this version, like the electric one, was not very successful, so it was not often used in combat. Of the nearly 5,000 Goliath/U devices produced in January 1945, 3,797 devices were still in stock.

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The poor results of the use of the Goliath devices forced the development in 1944 of a medium charge carrier called the Sprpreg Z4KYO 304. However, the brrpreg was too heavy, and its all-terrain capability left much to be desired. A 4-cylinder Ore!-Motog engine with a volume of 1.5 liters was used as a power plant and powerfully

size 36 l. With. The device could develop a maximum speed of 42 km/h, a fuel supply of 42 liters ensured a cruising range of up to 80 km. The thickness of the armor in front was 10 mm, from the sides - 5 mm.

The device carried 300 kg of explosive, it went to the place of application under its own power under the control of the driver. During combat use, control was carried out. with the help of the radio system of the company Vairipke. Initially, it was planned to manufacture 460 vehicles before May 1945, but in total they managed to manufacture at the M $ O-\ ezh

- only 50 pieces. Of this number, only three vehicles were transferred for military testing. It was also planned to use Sglreg as a destroyer of KhUan2e tanks with a 105-mm gun.

12 M. and V. Kozyrev

32. SUPER HEAVY MINESWEEPERS

The problem of demining fields became acute during the Second World War. The British were the most inventive in this direction. They created, for example, a combat technical device Vapriogre Togre-Fo, which was a metal tube filled with an explosive and sealed at both ends. Most types of Bangalore had mechanical fasteners at each end to increase the length of the torpedo. These torpedoes, about 1.5 m long, were used to clear paths through minefields. The torpedo was attached in front of the SPIGSISH tank, which pushed it into the mined area and blew it up there.

When making passages in the minefields of a large area, to save time and effort, longer Spake ("Snake") modification torpedoes were used. One section of the “Snakes” filled with explosives had a length of 6.1 m, of which it was possible to make a torpedo with a total length of up to 366 m. field and then broke, this made it possible to clear a path up to a width of 6.4

m.

The British also used a device called Sopveg (“Eel”), which was a long hose or fire hose. One end of the hose was attached to a rocket, with which it was thrown into a minefield. Liquid explosive was then pumped into the Eel and detonated.

The smallest torpedo in the Vapragoge family was the Nushtya Vapragoge flying model. It was equipped with a rocket engine and was designed to clear passages through barbed wire. The torpedo was launched on a wire fence, and in the final section of the trajectory it | hooked on the wire with its small hooks, after which it was undermined. | Roller minesweeper was one of the most common | | 'none and very simple

devices for making: passages in minefields. In this role, tanks or tractors were used with a set of heavy { rollers fixed in front, the weight of which turned out to be sufficient to destroy the mines. The main problem was the heavy weight and large size of the rollers, which required the use of at least a medium tank to move them. In practice, two tanks were often used to move massive rollers over soft ground. The British used the AMKA and AMKSK roller minesweepers using the ESIshgeÿÿ, Sÿertap and Souepameg tanks. The Canadians used the STV system with the same tanks, the Americans stood on

a solid armor that simply moved through the myths and blew them up, relying on its powerful armor. $ The losses suffered by the German armored vehicles from Sofet mines, as well as the low efficiency of the remotely controlled tankettes of the Vogr / aga company, became the reason for the development of roller minesweepers by the Germans. Firms "Alkett" and "Krupp" were given the task to create fiashins capable of making passages in minefields with a width of at least 3 m.

Aken Vaitdega:

The first sample of the minesweeper ASCHey Kashtrega! was built in 1942, the thickness of the armor of the car was in different sizes from 20 to 40 mm, from below the thickness of the armor reached 0 mm in order to withstand mine explosions.

ÿ| The car was made according to a three-wheel scheme: two new wheels with a diameter of more than 2 m in front and behind

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one steering wheel with a smaller diameter. The wheels were equipped along the rim with steel removable shoes, which were supposed to crush mines. The vehicle was 2.7 m high, 10 m long and weighed 40 tons. However, military trials showed that the low speed and impressive size of the vehicle made it an easy target for the enemy. Pretty soon it became clear that conventional tanks converted for this purpose were much more practical, so work on the AJ Kaiteega was interrupted. Ten of these machines were discovered by Soviet troops in Kummersdorf at the end of the war.

Caotag 5

In 1944, the Krupp company created its own version of a super-heavy minesweeper. This monster, weighing 130 tons, 3.27 m wide and 15.63 m in total length, moved on four steel wheels 2.7 m in diameter. Removable rubber shoes 150 mm thick were attached to the wheel rims. Structurally, Kaiteg $ consisted of two identical two-wheeled platforms connected by a massive articulated assembly. Each part of the Vaiteg $ was equipped with a Mau-Basch N1.90 engine with a power of 360 hp. With. The prototype Kashteg 5 was captured at the end of the war by American troops at the training ground in Hillersleben.

33. ANTI-TANK GUNS

$P;B 41 / PAK 41 + In the middle of the war, anti-tank guns were developed using a barrel with a conical bore. Shooting from such a gun was carried out with a special projectile, the core of which was made of tungsten, a hard and very dense metal, ideal for armoring tank armor. The shells had flanging in the form of an "apron", this shape allowed the flanging to be compressed when the projectile moved along the tapering bore. This increased the initial velocity of the projectile, as a result, the firing range and the effectiveness of hitting the target increased. However, such guns had one significant drawback - the reserves of tungsten in Germany were very small, especially at the end of the war, and the anti-tank gun was expensive to manufacture. I was the first to develop a heavy anti-tank ru ÿsÿÿmege Raphegrisÿÿ 41 (5ÿ2ÿ 41) of 28 mm caliber. The bore diameter of the gun barrel decreased from 28 mm in the breech to 20 mm at the muzzle cut. The 8R2V 41 shotgun was produced in two versions. The first version had a chassis with two large wheels, it was often installed on a passenger car.

mobile Ke 15 to increase the firepower of infantry units. The gun was easily removed from the vehicle for normal use. The second version of the gun had small wheels and tubular frames made of light alloy; it was intended for arming parachute assault rifles.

ranks of the Luftwaffe. Both versions of the gun were used until the end of the war.

The second type of weapon was the light anti-tank gun 4.2-stp Rap?egaÿmmeÿtkapope 41 (e Rak 41), which was produced for paratrooper units. The bore diameter of the gun barrel was reduced from 40.3 mm to 29.4 mm;

The largest was the 7.5-st Pak 41 cannon, the diameter of its bore was reduced from 75 mm to 55 mm. It showed such a great advantage in armor-piercing over the 7.5-st Pak 40 gun that they wanted to accept it as a standard anti-tank weapon. However, the situation with tungsten worsened, as raw materials were imported into Germany from abroad, and when sea transports began to be intercepted by the Allied fleets more and more often, tungsten reserves were depleted. Thus, the production of this type of weapon, despite its high efficiency, ceased. Only 150 Pak 41s were produced, and as soon as their ammunition was used up, these guns fell into disuse. The same was true for the other two types of weapons, although 5ÿ2ÿ 41 were still in use in 1945, since the shells for them were still in stock.

Characteristics of 2.8-st 5REV 41: starting caliber - 28 mm; output caliber. - 20 mm; barrel length - 1.7 m; weight - 223 kg; maximum angle: elevation - 45; horizontal aiming angle - 90; projectile weight - 0.124 kg; initial speed - 1400 m / s; armor-piercing - 56 mm armor at a distance of 365 m.

Characteristics 4.2-st | eRak 41: starting caliber - 40.3 mm; output caliber - 29.4 mm; barrel length - 2.25 m; weight - 560 kg; maximum elevation angle - Horizontal aiming angle - 60; shell weight

-- 0.336 kt; initial speed - 1265 m / s; armor-piercing - 72 mm armor at a distance of 455 m.

Characteristics of 7.5-st Cancer 41: starting caliber - 75 mm; output caliber - 55 mm; barrel length - 4.32 m; weight - 1390 kg; maximum elevation angle - 18; horizontal aiming angle - 60 "; projectile weight - 2.5 kg; initial speed - 1230 m / s; armor-piercing - 171 mm armor at a distance of 455 m.

Cancer 43

In mid-1942, the Krupp concern received an order to develop an 88-mm anti-tank gun. To speed up the work, a carriage from a 100-mm Rheinmetall field gun was used, which was not accepted into service. In the spring of the following year, the cannon under the designation Cancer 43/41 began to receive 8 troops. Total from March 1943 to August. In 1944, 1077 guns of this type were manufactured. The Pak 43/41 gun became one of the most powerful anti-tank guns of the war period.

On the basis of Pak 43/41, the Pak 43 anti-tank gun was developed on a four-wheeled carriage, which made it possible to conduct circular horizontal fire. In the combat position, the gun was lowered from four supports, which gave it stability when. shooting. The Pak 43 cannon began to enter service in the fall of 1944; by October 1, the number of cannons in the troops was 578 pieces, ac | January 1945 - 829 pieces. However, with high combat performance, the gun turned out to be inactive due to its large weight.

Characteristics Cancer 43: caliber - 88 mm; length - 9.2 m; barrel length - 6.35 m; weight - 3600 kg; maximum elevation angle - 40; horizontal aiming angle - 360 ": projectile weight - 10.2 kg; initial speed - 1000 m / s; rate of fire - 6-10 rounds per minute; armor-piercing - 163 mm armor at a distance of 1000 m.

Characteristics Cancer 43/41: caliber - 88 mm; length - 9.14 m; barrel length - 6.36 m; weight - 4350 kg; maximum elevation angle - 38; horizontal aiming angle — 56; projectile weight - 10.2 kg; initial speed - 1000 m / s; rate of fire - 6-10 rounds per minute; armor-piercing - 163 mm armor at a distance of 1000 m.

34. ANTI-TANK Grenade Launchers and Rockets

Kakegeppheistve - In 1943, the Germans captured a number of 60-mm American M1 bazookas in Tunisia. After the simple and cheap design · they were studied by German specialists, a of the 8.8-cm Vaksteprapgegrisvse 43 (KRV) grenade launcher. The VR2V grenade launcher had yet another name - Oepgong ("Open pipe").

It was a pipe open on both sides, from which a cumulative action mine was launched. The fire was fired from the shoulder, pressing the trigger gave an electrical signal through the wires to the engine of the mine, the weapon was equipped with a simple aiming system. The KRV had better armor-piercing capability than the bazooka, but a limited range of approximately 150 m. chatki and gas mask to avoid burns.

The discharge from firing was dangerous at a distance of up to 4 m from the back of the tube, and it could also raise clouds of dust, unmasking the shooter and allowing the enemy to detect his position. This last factor caused the German soldiers to dislike the BP2V 43. A further development was the KR2V 54 Raptegvshygek (“Tank Horror”), which had a protective shield, which removed the requirement to wear a protective one. clothing and gas masks. A later version of KR2V 54/1 used an improved

a mine that required a shorter launch tube but had a range of 180 m.

This weapon soon became widespread, it was used on almost all fronts. Later versions could penetrate tank armor up to 160 mm thick. Typically, the grenade launcher crew consisted of two people, one aimed, and the other loaded the mine and connected the igniter wires to the launcher contacts. As a countermeasure against KR2V, the allies used the protection of tanks with sandbags or additional armor, as well as the protection of tanks. infantry riflemen who moved with them. 3)

Characteristics of KR2V 54: length - 1.64 m; caliber - 88 mm; weight with safety shield - 11 kg; grenade weight - 3.3 kg; the weight of the boesarid is 0.65 kg; range - 150 m; rate of fire - 4-5 rounds per minute.

"Panzerfaust"

The Panzerfaust hand-held anti-tank grenade launcher (galgegÿaiv - armored fist) was developed at the end of 1942 by the HA5AC (Nivo Schleÿyeg AS) company in Leipzig to provide soldiers with personal anti-tank weapons, cheap and simple.

The grenade launcher was a tube into which a cumulative action mine was inserted from the front. Inside the tube is placed a propellant charge in a cardboard case. The mine consisted of two parts, fastened with a threaded connection: the head, protruding from the barrel, and the tail, located in the barrel and equipped with folded stabilizer blades.

In flight, four steel pins were extended from the body of the mine to stabilize its movement.

The first Panzerfausts entered service in August 1943, this initial version was known as the Panzerfaust 30 (Pet), the number 30 meant range in meters. Additive "Kÿsÿp" (small) appeared after a projectile of larger diameter was adopted to increase armor-piercing. The short range of these early models was often

a great inconvenience for the shooters, who had to get very close to the tank.

After the Panzerfaust 30, came the Panzerfaust 60 and the Panzerfaust 100, both with greater range, achieved by increasing the weight of the propellant charge, although the mine remained the same. There were plans to introduce the Panzerfaust 150 and even the Panzerfaust 250, but the end of the war interrupted these works. The Panzerfaust 100 projectile could penetrate up to 200mm thick armor even at 30", while the smaller Panzerfaust 30 (Kesh) could only penetrate 140mm armor. Any allied tank became vulnerable to the Panzerfaust, so the tankers applied additional protective measures by placing sandbags in all probable hit points. The Panzerfaust grenade launchers were single-shot weapons, so it was planned that the planned Panzerfaust 150 and Panzerfaust 250 would be reloadable.

"Panzerfausts" were produced in huge quantities, so both the infantry and almost every German vehicle were equipped with them. If the Panzerfaust was properly aimed and used at the appropriate distance, then every German soldier would be able to knock out at least one allied tank, but the introduction of additional armor protection and the infantry units accompanying the tanks reduced the effectiveness of this weapon.

Characteristics of "Panzerfaust" 30 (Kÿsÿp): weight - 148 kg; body diameter - 0.1 m; initial speed - 30 m/s; "range - 30 m; armor-piercing - 100 mm.

Characteristics of "Panzerfaust" 30: weight - 5.22 kg; case diameter — 0.15 m; initial speed - 30 m/s; range — 30 m; armor-piercing - 200 mm.

Characteristics of "Panzerfaust" 60: weight - 6.8 kg; case diameter — 0.15 m; initial speed - 45 m / s; range — 60 m; armor-piercing - 200 mm.

In 1943, the 8.8-cm Kakegepmeyeg 43 Rirrszhep (Doll) easel grenade launcher was put into service, with a pitchfork resembling a small cannon on wheels. od

However, at the bean position, the wheels could be removed to reduce the silhouette of the grenade launcher. The grenade was loaded from behind using a conventional artillery mechanism. What Rirrsjen differed from an artillery gun, only in the absence of recoil when fired. The recoil energy that occurs during the launch of a grenade was absorbed by the mass of the carriage, the gunner could aim the tube of the launcher using the sight.

RirreNey had a maximum range of approximately 700 m, although effective shooting at tanks could be carried out at a distance of no more than 230 m, since the aiming system was rather primitive, and the grenade flight time could be measured in seconds. The maximum rate of fire was up to 10 rounds per minute. Another feature of the Rirrsjen project was that the grenade launcher could be disassembled into seven separate units for transportation, and skis could be used to move through the snow. There were even printed instructions on the inside of the shield so that on the battlefield a grenade launcher could

use a soldier who is not trained in shooting. Rirrsjen was not in production for long. As soon as the first products were fired, American bazookas were captured in Tunisia, and the German specialists soon realized that a simple launch tube was what was needed to launch 8.8 cm grenades, and the complex design of the Pyrrsen was unnecessary. i

Thus, production stopped almost immediately after it began and was instead concentrated on the production of BP2B. But those examples of Rirrspep that were produced remained until the end of the war, especially in Italy, where a large number of them were captured by the Allies. It was planned to put the modified Rirrsjen on light armored vehicles, but these plans were not implemented.

Characteristics of Vakeepuer er 43: length - 2.87 m; launch tube length - 1.6 m; caliber - 88 mm; weight during transportation — 146 kg; combat weight - 100 kg; grenade weight - 2.66 kg; maximum elevation angle - 15 °; horizontal firing angle - 60°; the maximum range against tanks is 230 m.

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X-7

Designed as X-7 Bo{Karrswep, development began in 1943 under the direction of Dr. Kramer, the missile was originally intended for use as an air-to-air missile. However, already after the production of the prototype, it was decided to modify the EU into an army anti-tank missile with a cumulative warhead weighing 2.5 kg. As a control system, we decided to use the system developed two years earlier by BMM with the transmission of control signals by wires.

The Kh-7 rocket had a cornus with a gyroscope and a rocket engine, two aerodynamic planes and a control device. Containers with wires were attached to the ends of the planes. The rocket was launched in the following way. From a 300-volt battery, a signal was sent via a cable to ignite the powder charge of the gyroscope. Flowing out of the tangential holes, the combustion products spun the gyroscope up to a given number of revolutions. At the same time, the MASAC 506 rocket engine was launched. It was equipped with a powder charge weighing 3–3.5 kg, which included two compositions: fast-burning gunpowder was used for the first stage (thrust 62.6 kg for 2.5 s) and slowly burning powder was used for the second stage (thrust 4.9 kg for 8-8.5 s). The annular first stage was used to achieve a high launch velocity, and it was isolated from the charge of the second stage by a Rosep layer (a mixture of asbestos, graphite, and calcium silicate). After the rocket was launched, control commands were transmitted over wires with visual guidance. For control, we used the systems proposed by the firms ÿÿÿÿÿÿÿÿ, EC? and KRE. The missile's cumulative warhead penetrated 200 mm armor at a distance of up to 1200 m.

In total, approximately 300 missiles were fired, and a certain number of missiles from the pre-production batch were used in combat operations. The factories of Kiÿgyaÿÿmetk in Brakwede and Meshapi-ÿsÿe Metka in Neubrandenburg were prepared for mass production. The Allies discovered a large number of rockets at the end of the war in underground warehouses near the Harz.

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In 1944, it was planned to use Vaucary as an air-to-ground missile. Several test launches took place with the Ru 190, but the problems of the missile's stability in flight were never resolved. Therefore, at the beginning of 1945, it was planned to use the X-7 as a variety of anti-aircraft multiple launch rockets Pisa ("Air fist") to fight low-flying aircraft. In this case, the high-explosive charge was to be replaced by a high-explosive charge; for guidance, it was supposed to use the Sciprosk infrared system.

Characteristics of X-7: scope of the ryla --- 0.6 m; length - 0.758 m; hull diameter - 0.14 m; weight - 9 kg; charge weight - 2.5 kg; operating time of the 1st stage - 2.5 s with a thrust of 68 kgf; operating time 2nd

steps - 8 s with a thrust of 5.5 kg; maximum speed - 98 m / s; range - 1200 m.

Votre! Yesseep E

Similar to the X-7, an anti-tank missile project called Kitreÿÿÿÿsÿep (an evil spirit from Germanic mythology) was being developed by the leadership of Dr. Kluge of the AES firm. Kegge's remote control system operated on four frequency-synchronized light beams. An experimental series of 100 missiles was launched.

Vosheep

A series of anti-tank missiles called Kozhep was developed in the summer of 1944 at the TUA department in Gotenhafen. Rockets with an aerodynamic carrier body were designed to carry a standard Panzerfaust grenade as a warhead. The rocket body was made of plywood, with elongated end washers on its sides, and an elevator in the tail section. at

The unguided rocket Kozhep-600 had a range of up to 500 m, in the designation of the rocket the number indicated the length of the aircraft (600 mm), its width was 310 mm. As a warhead, the rocket carried two or three Panzerfausts, so the Kozhep-600 rocket weighed 15 kg or 22 kg, respectively.

The remote-controlled version of the Kozhep-1000 was developed to fight tanks at ranges up to 1500 m. This version was equipped with three or four Panzerfausts, the width of the missile was 520 mm. The weight of the rocket, depending on the load, was 40 kg or 57
kg.

Kozhep-2000 differed from the first two models by the installation of an additional sustainer engine that developed a thrust of 60 kgf, the rocket was equipped with a remote control system. The range of the missile against tanks was up to 3 thousand meters. Depending on the warhead, with a missile width of 1050 mm, it had a weight of 160-230 kg. On the basis of tests of prototypes of the Mo-szhep-600 variant, the EM company (Biekigoteshapischep UMegke) developed the Rapgeg-Vipdeg anti-tank missile. A similar model was developed by the NAZAS company under the designation Kareÿÿai (“Cod”).

Nipdeg -

EMI” in Karlshagen received at the beginning of 1945 an order for the development of an anti-tank missile Yeshideg (“Flounder”) with an aerodynamic carrier body. By February 1, there was the first version of the project, which could also be used as an anti-aircraft missile against formations of allied bombers. The remote control was the same as that of the X-7 rocket, by wire, the charge consisted of a Panzerfaust. It was supposed to launch a rocket with a length of 983 mm and a weight of 11 kg from a small catapult using a solid fuel booster. The possibility of using a sustainer engine on a rocket was investigated.

An optical guidance system was developed based on two sights connected to a computer and a transmitter. The system was serviced by two gunners. During launch, one gunner aimed through his sight at. the attacked tank, and the second gunner kept the mark of his sight on the flying rocket with the help of a special joystick. The signals from both sights were entered into the computer, which automatically tried to match the marks, transmitting control signals to the rocket. However, the receiver of the rocket control mechanism turned out to be

too much

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strong. Therefore, the weight of the rocket exceeded the weight limit established by the technical requirements (10 kg), despite the fact that the rocket body was made of fa-Co with a thickness of only 1.5 mm. Until the end of the war, only models for testing in aerodynamic tubes had been developed.

Raplegulugÿtile (1) Rapgegÿshÿshÿle (1) was designed for use by tank destroyer infantry. It was a specialized form of anti-tank grenade that used a HEAT warhead capable of inflicting maximum damage to tank armor. The grenade was equipped with a tail to stabilize the direction of flight. It was thrown at the target in the following way. The soldier took the grenade by the handle and held it behind his back so that the warhead was directed 5 fold upwards. Then, with a sharp movement, he threw out (rolled his hand forward and released the handle of the grenade. As soon as the grenade was in flight, the four canvas tails with the help of springs unfolded like a half-open umbrella, due to this, the warhead always E was in the front position to have the maximum effect when hitting the target.

"you were limited by the strength and ability of the throwing soldier and usually amounted to no more than 30 m. Throwing accuracy was ensured only by long exercises with special training grenades. In other close combat anti-tank weapons used by the Germans, these grenades were surprisingly small, light and handy, They were REALLY powerful, since the warhead had a charge of 0.52 kg. thick Ebroni of almost all allied tanks.

: Captured samples of grenades were often used by fellow soldiers, but the Americans initially misunderstood them.

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used by throwing them like javelins or spears. As soon as the mistake was discovered, the American technical intelligence issued special bulletins to correct this practice. After 1945, grenades of this type were used for some time in various countries, and the Egyptians, for example, until recently copied Raptetuligitype. They found this type of anti-tank weapon to be a perfect match for their infantry's anti-tank tactics, and the Egyptian version of the grenade was reportedly very effective against modern tanks.

Characteristics Rapgegush she (1): length - 533 mm; diameter - 114.3 mm; weight - 1.35 kg; charge weight - 0.52 kg.

35. REACTIVE ARTILLERY .

In technical terms, by the beginning of the war, the Germans were the furthest advanced in the field of creating rocket artillery. However, they used rockets mainly as a support weapon for conventional artillery and only occasionally tried to use rocket systems for offensives. The basis of the German rocket artillery was Mebeueyeg-type mounts and their various variants adapted for firing rockets of 15, 21, 28, 30 and 32 cm caliber. At the end of the war, studies were carried out on equipping submarines with rocket systems.

15-st Migbagapate 41

At the end of the 30s. tests were successfully carried out at the Kummersdorf test site. libra 150 mm.
- "throwing smoke"), originally They were intended for army sub-. divisions of artillery rockets ka-MeBgimeteg (literally formed to set up smoke screens for tactical purposes and conduct chemical warfare. By 1941, the first missiles were ready for deployment.

The missiles were produced in two versions: 15-hundred Ui rtpa-16 41 Srepv (high-explosive) and 15-st Uli fgapae 41 m Ka Meze! {lymovaya). They were outwardly similar, in flight the stabilization of the rocket was carried out by its spinning around the axis due to the expiration of part of the gases through the holes along the circumference of the body. In flight, the rocket had a distinctive humming

the sound that led the Allies to give her the nickname Moapipre Mippie ("Moaning Minnie").

The first launcher to fire these missiles was a single-barreled device known as the Oo-Seta! 1 (by the name of General Dornberter). It was intended for use by airborne units, but was used quite rarely. Then they developed the main version of the launcher under the designation 15-st MeVeimeget 41 (Komi 41).

The installation was a 6-barrel rocket launcher on a two-wheeled carriage, the barrels were connected together in a package using the front and rear clips. The carriage was a modification of the chassis of the 3.7-cm Pak 35/36 anti-tank gun, when firing, the wheels were lifted up, the missiles were launched one by one in strict sequence. In the Zitat variant, there were 12 or more launchers in one battery. A single battery attack could be devastating because the missiles covered a large area around the target and the explosions from the missiles were powerful. On the march, the MeBe! Met 41 was usually towed by a light half-track vehicle, which also carried additional ammunition and other equipment, but in 1942 a mobile launcher was introduced.

It was the 15-st Rapgepmeyeg 42 (R2UUgG 42), which was a half-tracked armored personnel carrier Zak 4/1 Mashtseg ("Mule") with a rocket launcher mounted on top. (two rows of five trunks). Up to 10 missiles could be carried ready for battle in the launcher and another 10 missiles inside the armored body of the vehicle. At the end of the war, similar launchers were used on the 8U5 half-track armored car (estimated Megtasÿÿsÿÿerreg), which was also used to tow the MET 41 installation. 5%5 could carry 26 missiles inside its armored hull. -

Characteristics of 15 cm Uantapae 41 Srepv: length -

- 0.98 m; diameter - 0.158 m; weight - 31.8 kg; charge weight - 2.5 kg; initial speed - 342 m / s; range - 7055 m.

Specifications

on - 1.02 m; diameter - 0.158 m; weight - 35.9 kg; boez weight

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+ row - 3.9 kg; initial speed -- 342 m/s; range - # 6905 m. Characteristics Mezheimeteg 41: weight in the stowed position - ‹ nii - 590 kg; weight when shooting - 770 kg; number of trunks - + 6; maximum elevation angle - 45; angle of horizontal fire - 24; rate of fire „ Characteristics Rapgegmeter number of trunks - 10; maximum elevation angle - 42; weight when shooting - 7100 kg; angle of horizontal fire - 270; speed. rate of fire - 10 shots in 15 s.

21-st Shigapate 42 In 1941, a 210-mm version of the rocket appeared under the designation 21-st U'artapye 42 5rgepr. It contained 10.2 kg of a high-explosive charge, this weapon was so successful in use that the rockets were fired only with this charge. The rocket was used with only one type of launcher called 21st Mepheme[eg 42 (MYUUGG 42). For the first time such weapons were used against the Soviet Union in + 1943.

The caliber of the barrels caused the instability of the launcher during towing and firing. Therefore, the number of barrels was reduced to five, which solved the problems. In all other respects the two-wheeled chassis was the same as that of the earlier project. The launch of the missiles took place in the following way. After loading the missiles into the tubes, the crew of the launcher retreated to a safe distance (or even hid in a shelter), upon receiving an order to open the oya, command signals were given from the control panel, and the missiles were launched one at a time in the prescribed sequence i | When fired, the rockets produced a large amount of smoke and dust, and during the flight they produced a characteristic groaning noise. This combination of smoke, dust and noise meant that Mebemeyeg's batteries had to move quickly before enemy artillery covered them. Captured „ to hit the target 21 cm rockets were studied

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Americans, after which the 210-mm T36 rocket launcher was developed on their basis, which was used in a number of research programs. E

Characteristics 21-cm Aurapae 42 $perepe: length - 1.25 m; diameter - 0.21 m; weight - 109.6 kg; warhead weight - 10.2 kg; initial speed - 320 m / s; range - 7850 m.

Characteristics of the Mebeimenegg 42: weight in the stowed position - 605 kg; weight when shooting - 1100 kg; number of trunks - 5; maximum elevation angle - 45; horizontal firing angle — 24; rate of fire — 5 shots in 8 s.

28-st and 32-st UMitIcogreg

The 28 cm and 32 cm UMiogreg missiles entered service earlier than the 15 cm Ui rotpie. They had the same rocket engine, but differed in charge weight: the 28th U/shÿKogreg Prigepa used a high-explosive warhead, while the 32 cm UiKogreg MET50 had an incendiary warhead. These missiles had a range of about 2,000 meters and low accuracy, despite their rotational stabilization. They were quite devastating on impact, and the high-explosive rocket was valued in street fighting in cities where building destruction was required.

The missiles were delivered to the troops in wooden portable containers (PasKK_ze). These containers were also used as a launching device and were equipped with front legs to ensure aiming. In this form, both missiles could be used by attack aircraft to destroy bunkers or other fortifications, but more often the missiles were used as four blocks on a simple launch frame, known as ösÿÿÿetev \Ishfegae 40 or ÿsÿÿÿegev Uÿntÿregai 41, which differed from each other only frame material (in the first case - wood, in the second - steel). They were used against previously prepared fortifications, for example, during the siege of Sevastopol in 1942.

Soon, 287 mobile units were manufactured under the designation 32-st Mereÿetsegt 41, it was a simple two-wheeled trailer with frames for six missiles {three in each

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row house). In the case of using 28-cm rockets, the corresponding inserts were inserted into the guides. Another and even more mobile launcher for these missiles was the zhsÿÿmegeÿ Migÿgÿÿtep 40, in which six launch frames were installed on the sides of the semi-tracked armored personnel carrier SaKÿh 251/1 (three on each side). During the attack, the missiles were fired one by one in a certain sequence.

This mobile version of the installation was often used to support armored vehicles, especially at the beginning of the war with the Soviet Union. At the end of the war, other vehicles, often captured French ones, were used as mobile launchers. Whole

A range of 'light armored vehicles' were used for this role, some carrying only four missile frames. Many of these improvised mobile launchers were used in Normandy in 1944; Characteristics of 28-cm Mipkogreg Brgepr: length - a, 19 m; diameter - 0.28 m; weight - 82.2 kg; warhead weight - 49.8 kg; initial speed -- 145 m/s; range - 2138 m.

Characteristics of 32-cm U-ngikogreg M E150: length -

71.29 m; diameter - 0.32 m; weight - 79.0 kg; warhead weight - 39.8 kg; initial speed - 145 m / s; range - 2028 m; Characteristics 28-st / 32-st Mezhe | meteg 41: weight in the stowed position - 1130 kg; weight when shooting - 1630/1600 kg; number of guides - 6; maximum elevation angle - 45; angle of horizontal fire - 22; rate of fire - 5 shots in 8 s.

30-st MogKkogreg 42 Compared to the 28-cm and 32-cm rockets that entered service earlier, the 30-cm MshKogreg 42 Yurgepe rocket has been significantly improved. Introduced at the end of 1942, it was aerodynamically much smoother and cleaner, and also had a much higher thrust-to-weight ratio than any other German artillery rocket. However, these technical features were much less important to field detachments than

the fact that the more advanced type of fuel used by the new rocket produced less smoke as it moved. But with all these improvements, the 30 cm missile had no range advantage over existing missiles. It had an estimated range of approximately 6 thousand meters, but in practice the range was 4550 m.

The first launcher to use the new missiles was the 30 cm MeBe)met 42. This was a simple conversion of a two-wheeled 28/32 cm Mereuveret 41 launcher with launch tubes modified to fit the new missile shape and size. But soon a new modernization program was drawn up, in accordance with which a new chassis was developed for the Mefeimegist 41 and 42 based on the design of the chassis of the Pak 38 anti-tank gun. a set of inserts in the barrels so that 15 cm rockets can be fired if required. When not in use, the 15 cm rails retracted to the top of the power frame.

There was another upgrade that could use 30 cm rockets from the ZAK armored personnel carrier. 251/1, originally designed for use with 28 cm and 32 cm rockets. Despite relative improvements over earlier artillery rockets, the 30 cm rocket was not used in large numbers.

Launchers were also developed for submarines. The initiative in this area belonged to the submarine commander Corvette Captain Fritz Steinhoff, whose brother, Dr. Ernst Steinhoff, worked at the Rocket Center in Peenemünde. In the summer of 1942, F. Steinhoff's boat was equipped with six launchers with 30-st UMiZhogre 42 Zrgepe (in subsequent experiments, suyerev \ Migregae (41) were tested. During the tests, the boat went at a depth of 12 m and automatically fired missiles. All the shells reached the target area, the spread was up to 3 km, however, this was proof that it was possible to launch missiles from a submerged boat along the enemy coast.

the water boat ÿ 1063 went missing while trying to attack with missiles a target on the west coast of Norway. Characteristics of 30-cm U-shikogreg 42: length - 1.23 m; diameter - 0.3 m; weight - 125.7 kg; the weight of the boesarid is 44.7 kg; initial speed - 230 m / s; range - 4550 m.

Launcher projects

At the end of the war, intensive development of new missiles and launchers for them was carried out.

In January 1945, the Krupp firm proposed launchers for two new 21-cm and 30-cm missiles, which were supposed to reach a range of up to 10 km, as well as projects for launchers for 30.5-cm and 42-cm missiles. -cm. The 30.5-cm caliber rocket weighed 250 kg, and at an initial speed of 260 m/s its range was 7 km. The 42-cm caliber rocket had a length of 1100 mm and weighed 500 kg. At an initial speed of 330 m/s, it could deliver 82 kg of explosive to a range of 8 km.

The Škoda firm developed the installation of 12-st Ui Kogreg 42, and the company Vpisheg Massijpeppabgÿk - Uig-Kogreg 43 with five guides. Tests "U / shtkogreg" 43 showed that too strong vibrations occur during firing.

At the end of 1944, the Rheinmetall firm offered installations for 24 cm and 38 cm rockets. But the largest installation was 85-sp-UMepeg, designed for 85 cm a pipe, which was transported on the march with the help of two four-wheeled carts. In position, it was installed like a mortar. The weight of the installation in combat readiness exceeded 1100 tons; the length of the launch tube was 15 m. It fired a projectile weighing 2200 kg at a distance of up to 210 km.

36. ARTILLERY SELF-PROPELLED INSTALLATIONS

Until 1939, self-propelled artillery existed mainly in the form of experimental models, but by 1943 these weapons were used by both warring parties. Some of the early self-propelled guns were simply conversions of existing tanks by installing artillery pieces. Others, however, were purposefully designed as self-propelled guns with

the very beginning.

Zigtaezstla Sh

- The German army, preparing for war, needed an armored mobile gun that could follow the infantry and support it with fire, suppressing enemy fortified points and bunkers. At the end of the 30s. such a gun was developed by the Daimler-Benz company, it used the chassis, transmission and control mechanisms of the RaKru NI tank. This armored gun was known as Ztsitirezvi IP, although officially it was called "Serapheye Seÿbÿÿÿÿÿpageye Yan Sÿÿygtveÿsÿÿÿÿ. 7.5 cm Capope 84KR 142 (1 gun model 3).

The gun differed from the tank by the absence of a turret, instead of which a low conning tower was installed with a short 75-mm gun in front. This version of the self-propelled gun was first put into service in 1940 under the designation 5EsO PE AceE A, and soon improved versions appeared - 5SHO SHAASHEV, S, O, E, Ei b. The main change in the 5shb Sh was the gradual strengthening of the armor and the improvement of the characteristics of the 75-mm gun, which originally had a barrel length of 24 calibers. Gradually, the gun was replaced by a longer gun capable of fighting tanks - 43 calibers long for 5i S Sh Am E and 48 calibers long for $06 I Ace b.

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However, the release of the latest $06 Sh models with anti-tank guns contradicted the original concept of close support for the advancing infantry. In the role of a tank destroyer, Zsh S Sh sometimes looked good, but he had insufficient driving performance and inadequate armor protection. It is precisely because of this that many 506 HIs with a 48-caliber gun were rejected by armored divisions, and instead of them, additional numbers of tanks were requested. But self-propelled guns were kept until the end of the war, since the German industry simply could not build a sufficient number of tanks. As an assault gun, the 5shS IN acted much more successfully. Ultimately, part of the 5iS NI self-propelled guns was armed with powerful 105-mm EnitavatsIge assault howitzers. The first sa-

“Motor howitzers” were built in 1943, but the production of this variant was slow.

The protective mask of the cannon underwent numerous changes before we ended up in the form of a bachkorg (“pig's head”), which had very good protective qualities. Protection against cumulative warheads of melee weapons was provided by additional screens Zsshshigey ("Skirt") on both sides of the hull. It was just sheet armor, which was used on many German tanks after 1943. At the end of the war, there were about 2,000 copies of 5ÿÿÿÿ ÿÿ of all variants on all fronts.

Characteristics 50b IP Ash E: crew - 4 people; weight - 23.9 tons; length - 6.77 m; width - 2.95 m; height - 2.16 m; power plant - Mauhashy engine with a capacity of 265 liters. With. (197.6 kW); maximum speed on the road - 40 km / h; power reserve - 165 km; armament - 75 mm assault gun and two 7.92 mm machine guns; armor thickness - 80 mm (forehead cutting) and 80 mm (forehead of the hull).

Mesre ÿ

Already in 1939, it was obvious that the R2Kryu P tank, which lacked armament and armor, should be replaced by a more powerful tank. Therefore, when the need arose to develop a self-propelled artillery mount based on the 10.5-cm 1eEN 18 field howitzer, they chose the very reliable and mass-produced R? Kruu P tank as the carrier.

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Alteration of the tank actually came down to moving the engine forward and installing a spacious conning tower, which occupied the middle and rear of the hull. The maximum armor thickness of the cabin walls was 18 mm. The prototype of the self-propelled unit, known as UUevre ("Osa") (although its full official designation was YeEN 18/2 ash Er Krg P (50 54KE 124 \ Mezre), was developed by Alkett in 1942, in the same In 1999, its mass production began at the Rato plant in Poland.It was a small self-propelled gun, which soon created for itself

. good reputation for reliability and mobility. The first self-propelled guns appeared on the Eastern Front during 1943. On this front, they were used in tank subunits and subunits of Raptegrin et. They were usually organized into batteries of six howitzers, with up to five batteries per battalion. A typical Mesre self-propelled gun had a crew of five, including the driver, and carried 32 rounds of ammunition. The firing range of the howitzer was about 10-11 km.

Mesre was so successful in the role of support artillery that Hitler himself gave the order that all production of the REKr A P chassis should be reoriented only under \ezre, and the production of other types of weapons using the R? KrVu 11 chassis should be canceled or redone. under a different chassis. By the middle of 1944, 682 Mesre models were built, after some time the production of self-propelled guns ceased, although another 158 samples without howitzers were produced, which were used as armored transporters for transporting ammunition to batteries.

Characteristics of Mesre: crew - 5 people; weight - 11 tons; length - 3.83 m; width - 2.28 m; height - 2.3 m; power plant — Mauhashy NEb6R engine with a capacity of 140 hp. With. (104.4 kW); maximum speed on the road - 40.0 km / h; power reserve - 220 km; armament - 105-mm ha killer and 7.92-mm machine gun MS 34; armor thickness - 30 mm (forehead of the hull) and 20 mm (forehead of the cabin).

"Hummel"

In 1941, a self-propelled unit was developed under the designation "Hummel" (Nitte! - bumblebee) (official name 15-st Rapgeednairige 18M ash SM ÿSh/GU

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ZAK # 165 “Nipte). The Hummel had a hybrid chassis - an extended undercarriage along with a power plant from the R2Krem TU tank, and tracks and transmission from the R? Krbu Sh tank. On the chassis

a conning tower was installed with a special version of the 150-mm EN 18 field howitzer, capable of firing a 43.5-kg projectile at a distance of up to 13,325 m. The new self-propelled gun began to be delivered to the troops in 1942.

The Hummel could only carry 18 rounds, so ammunition had to be stored nearby and brought in as needed. Trucks were often not suitable for transporting ammunition, so by the end of 1944 at least 150 self-propelled guns without howitzers were used as armored personnel carriers to deliver ammunition to Hummel batteries. By the end of the war, the total number of self-propelled howitzers produced was 724, they were used on all fronts. Special versions of self-propelled guns with more flexible tracks, known as Oyaksie, were produced for use in winter conditions on the Eastern Front, their open cabins were often covered with tarpaulins to protect the crew from bad weather. Many crews generally lived in self-propelled guns, which is why so many Hummels were decked out not only with camouflage of all kinds, but also with sleeping bags, cooking utensils, and personal items. The Hummel was one of the best examples of self-propelled artillery built by the Germans. It had plenty of room for the crew to service the gun, and the undercarriage gave the howitzer the mobility it needed to keep up with its armored units.

Characteristics of the "Hummel": crew - 5 people; weight - 241; length - 7.17 m; width - 2.87 m; height - 2.81 m; power plant — Mauhashy NI.230R30 engine with a capacity of 265 hp. With. (197.6 kW); maximum speed along the lorog - 42 km / h; power reserve - 215 km; armament — 150 mm howitzer and 7.92 mm machine gun; armor thickness - 50 mm (forehead of the hull) and 19 mm (forehead of the wheelhouse).

"Waffentrager"

The question of creating a new type of weapon called "Waffentrager" (U/aNetigareg - transporter or carrier of weapons) was first discussed in 1942.

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stood in the fact that the "Waffentrager" was supposed to become ” one self-propelled option not yet an artillery mount, but a specialized means of transferring artillery from place to place. The need to develop such a weapon was doubtful, since in 1942 the armored divisions still adhered to the tactics of conducting mobile warfare, and the need for static warfare by artillery seemed remote. Nevertheless, the Ordnance Department approved for development a list of eight types of Waffentragers needed to transport the following guns:

75 mm anti-tank gun Rak 40;

88 mm anti-tank gun Rak 43;

75-mm assault gun ZK 42;

150-mm field howitzer 5.E.N.18;

105 mm field howitzer [e.E.N-18/40;

100 mm K.18 guns;

128 mm K.43 guns;

37 mm anti-aircraft gun.

"Waffentrager" for the transportation of a light field howitzer 1e.E.N.18 / 40 received the designation Neshvsÿgeske GUV ("Locust"). These vehicles were converted from R2Krbu TU tanks with the installation of a power frame in the rear to raise into the conning tower and

install a 105-mm howitzer in it. In this case, the howitzer fired from the carrier. There was an option in which the cabin, together with the howitzer, could be removed from the vehicle and installed on the ground for firing, or the howitzer could be towed behind a vehicle on wheels, in this case the vehicle itself was used as a carrier of ammunition for the howitzer. A

In the winter of 1944/45, all Waffentragers were adapted for the same demountable cabins as those of the Neizsigeske GUV, although they had a variety of chassis, including the chassis from R?
Panthers, etc.

Characteristics of Nessisteske TUV: crew. height - 5 people; weight - 17 tons; length - 5.9 m; width - 2.87 m; - 2.25 m; power plant — Maubasi engine with a capacity of 188 hp. With. (140.2 kW); maximum speed on the road - 45 km / h; power reserve - 250 km; armament - 105-mm howitzer.

"Charles"

Work on the design of a self-propelled mortar called "Karl" (Ka) began at the Rheinmetall company in 1937. This concrete-piercing gun was intended for. destruction of the forts of the Maginot Line and other similar fortifications. Two versions of the mortar were developed: Motweg Sega! 040 caliber 60 cm and Mayher Sega! 041 caliber 54 cm, prototypes were built by the end of 1939.

Structurally, the mortar was located on a caterpillar undercarriage, with the help of which the gun could move over short distances at a speed of 10 km/h. When firing, the gun was lowered with its bottom to the ground for stability. Now! 040 fired concrete-piercing projectiles weighing 2170 kg at a range of 4500 m, and high-explosive projectiles weighing 1700 kg at a distance of 6700 m. 041 fired concrete-piercing and high-explosive projectiles weighing 1580 kg and 1250 kg, respectively, at a maximum range of up to 10,400 m. The rate of fire of both guns was one shot in 10 minutes. The ammunition load of the gun (8 shells) was brought up with the help of a special Mipshoprapgeg conveyor.

Although both versions of the Karla were self-propelled, their mobility was limited by their enormous weight and large dimensions, so the tracked chassis was intended only for moving to a firing position. When moving over long distances, they were suspended between two special railway platforms. When moving over shorter distances, the tool was disassembled into three parts, which were transported on wheeled trailers towed by heavy tractors. Assembly and disassembly were carried out using special cranes. The whole process of transportation was extremely laborious, since the "Karl" was not intended for mobile warfare.

In total, 6 self-propelled mortars were manufactured during the war years. The first samples of self-propelled guns did not have time to take part in the assault on the Maginot Line, which fell in 1940, so the "Karl" in the role intended for it actually took part in the hostilities only during the siege of Sevastopol. In 1944, self-propelled guns were used

to put down the Warsaw Uprising. By the end of the war, most of the early 60 cm self-propelled guns were replaced by 54 cm guns, but the siege of Warsaw was their last participation in hostilities. The increasing mobility of the war gave the Karls no chance to demonstrate their destructive capabilities, and most of the mortars were destroyed by the Germans in the last days of the war.

Characteristics of Sega 041: weight - 124.0 tons; length - 11.15 m; barrel length - 6.24; power plant — Maubazh engine with a capacity of 1200 liters. With. With. (894.8 kW); armament - 540-mm howitzer.

Vgitifag

Despite their rather successful use, the 5shb Sh assault guns were already considered by 1943 as weakly armored weapons. With the replacement of the Rakrg and TU tanks with the Nanterre and Tigr tanks, it became possible to use the later versions of the R2Krekh GU as the basis of a new self-propelled guns.

The first samples of this self-propelled gun appeared in 1943 under the designation Sÿshgtrapger VliptBat ("Gray Bear") with a howitzer in a ball mask installed in the front wall of the conning tower. This 12-caliber howitzer was known as the Figtnaz-Bige 43 and was a shortened version of the 15 cm $1433 self-propelled howitzer.

The cabin had powerful armor, its thickness in the frontal part reached 100 mm, so the crew of the self-propelled gun of five people was well protected. Later, side armored screens were added, and most of the assault guns acquired an anti-magnetic zimmerite coating. The first vehicles did not have defensive weapons, but the latest models were equipped with two machine guns.

The spacious fighting compartment could accommodate up to 38 15 cm shells. The commander was located at the rear of the wheelhouse, using a periscope mounted above the roof to select a target. The crew also included a gunner, two loaders and a driver. The driver, as a rule, remained in his place at the left in front during the shooting.

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Most targets during the fighting were hit by direct fire, but the gun was capable of indirect fire. Approximately 313 self-propelled guns were produced before the end of the war, they were most used in support of infantry and tank destroyers. Advancing with the first waves of attacking detachments and providing them with fire support, they suppressed enemy bunkers and fire fortifications. At the same time, the infantry had to always be in read, preventing enemy tank destroyer teams from getting too close to self-propelled guns, which were easy to knock out at close range with anti-tank weapons, especially since part of their side armor was only 30 mm thick.

Vgottbag was mainly used for attack. As a defensive weapon, it was less useful, since the short howitzer had limited effect against armor, its main mission was to fire high-explosive projectiles. A significant factor limiting the mobility of self-propelled guns was its heavy weight. On the roads, it moved quite well, but on rough terrain it could get stuck in soft ground.

Characteristics Vgittbag: crew - 5 people; weight - 28.2 tons; length - 5.93 m; width - 2.88 m; height - 2.52 m; power plant - engine Mauÿasÿ moshch-. capacity 265 l. With. (197.6 kW); maximum speed on the road - 40 km / h; power reserve - 210 km; armament - 150 mm howitzer and two 7.92 mm machine guns; armor thickness — 80 mm (forehead of the hull) and 100 mm (forehead of the wheelhouse).

"Sturmtigr" A In 1943, the Henschel company developed a version of the "Tiger" tank, known under several names - 38-st Schitttoger, Sturmtigr, and Sturmtigr. It was a Tiger tank, which had a conning tower with a short barrel in front instead of a turret. This barrel was not a gun, but a 380mm Bakeepmegyet 61 launcher of an unusual type, since it fired rocket-powered depth projectiles that were used in the navy. Each projectile weighed at least 345 kg, with almost the entire weight of the projectile falling on

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explosive. The firing range of such projectiles reached 5650 m.

The Sturmtigr had exceptionally powerful armor, 150 mm thick at the front and 80 to 85 mm thick at the sides. The Sturmtigr crew consisted of seven people, including the commander, gunner, driver and four people who serviced the launcher. Due to the large dimensions

only 12 rounds could be carried in the fighting compartment, one more could be inside the barrel. The shells were loaded into the self-propelled gun with the help of a winch installed at the rear of the wheelhouse.

Although the prototype "Sturmtigr" was ready by the end of 1943, mass production did not begin until August of the following year. A total of 10 vehicles were built, which were used one or two on different fronts. Most of them were soon either shot down or simply abandoned by their crews after running out of fuel.

Characteristics of "Sirgtiiveg": crew - 7 people; weight - 65 tons; length - 6.28 m; width - 3.57 m; height - 2.85 m; projectile length - 1.49 m; power plant - Maubasv engine with a capacity of 650 liters. With. (484.7 kW); maximum speed on the road - 40 km / h; power reserve - 120 km; armament - 38-cm Kaketepmetieg and 7.92-mm machine gun; armor thickness - 100 mm (forehead cutting).

vag

An assault self-propelled gun with a 30.5-cm cannon received the designation Vag ("Bear") during the design. On the chassis of the Tiger, extended to 7.96 m, a conning tower was installed in its rear part, equipped with a Skoda cannon with a barrel length of 4.89 m. For firing, Yugoslav-made shells weighing from 289 kg to 375 kg. With lighter projectiles, a range of approximately 11,000 meters was achieved. The self-propelled gun had powerful armor, so its weight reached 120 tons, after appropriate refinement it was possible to reduce the weight to 95 tons. Work on the project was stopped in the middle of 1943.

37. Anti-Aircraft Guns

Nok 4d/ÿÿaktue ÿler 40

In 1936, Rheinmetall received an order for the development of a field 128-mm gun under the designation Segag 40. This project was not a very high priority, so a prototype was built only in 1940. When the gun was shown to the military, they had the idea to use it against aircraft, so the gun was ordered into production as the 12.8 cm Pak 40 anti-aircraft gun.

By that time, there were already plans to create mobile anti-aircraft guns, so the first six guns were fired on mobile chassis. However, over long distances, the Nak 40 anti-aircraft gun could not be transported as a whole because of its bulkiness, so the gun was transported disassembled into two parts. But the disassembly and assembly of the gun turned out to be too time-consuming processes, so later versions of the gun were produced only in a stationary version. Anti-aircraft guns Nak 40 were installed around important industrial facilities and large cities such as Berlin and Vienna. Special turrets were built to mount the Eak 40, or in some places they were mounted on railway dreziks to provide the gun with some degree of mobility. The production of the stationary version began in 1942, but since it was an expensive and very complex weapon, by January 1945 only 570 guns were in service.

A twin version was also produced, known as the NakguShta 40. This version consisted of two 12.8 cm guns mounted side by side on the same carriage.

13 M n In Kozrevi 369

The NakluSte 40s were only mounted on special turrets around major cities within Germany, they were so expensive and labor intensive to manufacture that even by February 1945 only 33 guns were in service. By the end of the war, many anti-aircraft guns began to be installed on special railway trains. At the end of the war, a new 12.8 cm Nak 45 anti-aircraft gun was also in development, which was supposed to be more powerful than its predecessor. However, they managed to build only a single sample of RVC 45.

Characteristics Nak 40: caliber - 128 mm; barrel length — 7.84 m; gun length - 15 m; weight in the stowed position - 27 tons; weight on a mobile chassis - 17 tons; weight on fixed chassis — 13 t; maximum elevation angle - 87.7; horizontal angle of attachment - 360; shell weight yes - 26 kg; initial speed - 880 m / s; maximum firing height - 14,800 m; rate of fire - up to 14 rounds per minute. :

Nak 41

The experience of the beginning of the war showed that the anti-aircraft guns that were in service could not effectively shoot at aircraft flying in the altitude range from 1.5 to 3 thousand meters. The targets flying in this zone were too high for - 20 mm and 37 mm guns or too low for 128 mm guns. Obviously, weapons were needed between

exact caliber that could solve this problem. Rheinmetall was given an order to develop an anti-aircraft gun NaK 41, caliber 50 mm. A total of 60 guns were built, the first of them entered service in 1941. The shortcomings of guns of this type soon became obvious: the shot was accompanied by strong recoil and a bright flash that blinded the gunner even in the daytime, the chassis turned out to be rather large and clumsy, and the aiming mechanism was too slow to track high-speed targets. Two versions of the Nak 41 were launched into production - a mobile version on a four-wheeled chassis and a stationary version for installation near important industrial facilities. The anti-aircraft gun was serviced by a crew of 7 people. Tool if needed

could be used to fire armor-piercing shells at tanks.

It soon became clear that the Nak 41. anti-aircraft gun turned out to be an ineffective weapon, nevertheless it was used until the end of the war. By the time Germany surrendered,

a total of 24 Nak 41 guns. - Characteristics of the Bak 41: caliber - 50 mm; barrel length - 4.69 m; weight - 3100 kg; maximum elevation angle — 90; horizontal aiming angle - 360; projectile weight - 2.2 kg; initial speed - 840 m / s; maximum shooting height - 3050 m; rate of fire - up to 180 rounds per minute.

Nak 43/akhmipo 43

By 1942, the German hinterland was under the threat of Allied bombing, where there was never enough anti-aircraft weapons for defense. The standard weapon for combating low-flying aircraft among the Germans was a 3.7-cm anti-aircraft gun, so in 1942 the Rheinmetall company received an order to develop a new gun to replace the expensive and labor-intensive Nak 36 gun. /37. In an effort to quickly launch new weapons into production as a basis. during development, the design of the gun and ammunition Nak 36/37 was adopted.

At the beginning of 1944, the first guns under the designation Nak 43 were ready. In maintenance, the gun proved to be very convenient, but it was not very effective against high-speed armored aircraft, since in the event of a hit, a single anti-aircraft gun projectile did not always shoot down the aircraft. The only possible solution was to multiply the number of barrels on one chassis, and this led to the creation of the 3.7 cm NakguShtv 43 with two barrels one above the other, the gun was placed on a four-wheeled chassis. This made the Pact pr more effective than the single-barrel version. Both versions were produced until the end of the war, there were even plans for the development of a quadruple gun. In addition, a project was being developed for a twin gun, in which two barrels were installed side by side.

Fortunately for the crews of the allied bombers, the number of anti-aircraft guns E!ak 43 and Nakgul pr 43 was never produced in sufficient quantities for defense. By February 1945, only 1,032 anti-aircraft guns of both types were produced, but of this number, only 280 were double-barreled. In combat conditions, both types of guns were serviced by a crew of six people.

Characteristics Nak 43: caliber - 37 mm; trunk length - 3.3 m; weight - 1392 kg; maximum elevation angle — 90; horizontal aiming angle - 360; projectile weight - 0.64 kg; initial speed - 840 m / s; maximum firing altitude - 4800 m; rate of fire - 250 rounds per minute.

38. RAILWAY GUN

After 1933, the department for the development of railway artillery in the Krupp company grew from 20 to 2 thousand people. Erich Müller, former director of the Berlin-Tempelhof company of the national railway, was appointed head of the department. The new railway guns were intended for concentrated fire support during the offensive of friendly troops, as well as for coastal units. In May 1940, the German troops included 9 railway batteries: artillery under the numbers: 676, 679, 680, 681, 702, 720, 766, 780 and 781. On June 22, 1941 (the beginning of the operation “ Barbarossa”), the distribution of batteries along the fronts was as follows: Eastern Front - southern sector (2 batteries), central sector (5), northern sector (2), Balkans - 1 battery, Western Front - 9 batteries, in the test center Rügenwalde - | battery.

Until 1944, lushki were marked as follows: Revvap (super-heavy artillery), “Berlin U/15” (location of the weapons department), Repÿÿsÿe KeÿsÿvVÿÿp Vet with a 6-digit number. All rolling stock is the same. The railroad, including cannon platforms, was under the responsibility of the German National Railway System, which supplied not only locomotives and train crews, but also engineering and technical staff for rolling stock maintenance. The artillery department of the army was responsible for the guns and auxiliary equipment, and the preparation of combat positions for the guns, the installation of turntables, protective supports, camouflage of combat positions, etc., were carried out by special teams. railroad teams. mi

The advantages of railroad guns, especially the latest models, were as follows: large caliber and long range, reducing the likelihood

, detection of the cannon by the enemy, lower weight characteristics compared to naval guns of the same caliber and range, stable firing characteristics due to the greater weight of the cannon.

However, large size and limited mobility. railway guns made them vulnerable to air attacks, which required the deployment of anti-aircraft artillery and smoke screeners, as well as detachments to protect the guns and trains serving them from attacks from the ground. Serious damage to the railway network could cut off tracks evacuation of the cannon from the combat position, in this case the cannon had to be destroyed by its own team in order to prevent its capture by the enemy. During long operations, concrete shelters and bunkers were built for cannon crews, support personnel, ammunition, spare parts, etc. E

15-st-K (E) / 17-st-K (E)

In 1933-1934. the program for the construction of railway guns of calibers 15 and ÿ cm began. was carried out by naval shells RTG. 1/41 K? 610 mm long and weighing 45.3 kg. The weight of the explosive was 4.5-5.7 kg, the initial projectile velocity of 805 m/s made it possible to reach a range of 22.5 km. These heavy guns (weight 74.0 tons) produced up to. the beginning of the war 18 copies with ammunition for them in the amount of 4426 shells. 3

The 17-st-K (E) gun was mounted on two platforms 6.9 m long each, a 172.6 mm caliber naval gun barrel was used. Frgeg high-explosives were used as projectiles. 1 / 4.7 Kx length 813 mm, weight 62.8 kg and explosive weight 7.7 kg. The initial speed of the projectile was 860 m / s, the firing range was up to 26.1 km. The weight of the 17-st-K (E) gun was 80 tons, six of them were built before the war with 6197 shells for them.

In addition, there were 18 more coastal stationary guns of this caliber. Of the ammunition in March 1945, there were 1,700 shells available.

20.3-st-K (E)

The railway gun 20.3-st-K (E) was built in 1936 and operated under this name until 1941. It was a modification of the ZK S/34 naval gun, which was created for heavy cruisers of the Adtia class! Nir-reg (Vipshyeg, Adtia! Nirreg, Rapg Birep). The gun weighed 86.1 tons, length. the barrel was 12.15 m with a total gun length of 19.44 m. The gun itself weighed 20.7 tons, it was mounted on two 4-axle railway platforms. The gun could be transported on dirt roads on two 6-axle trailers. Circular shelling was carried out from a rounded section of the railway track or from a special turntable of Wareje.

High-explosive projectiles Zreg were used for firing. 1/4, 7954 mm long and weighing 122 kg. A projectile carrying 9 kg of explosive at an initial velocity of 925 m/s reached a range of 36.4 km. In total, eight such guns were built, they were considered a very successful improvisation. In 1941, naval guns, as they did not meet the army standard, were replaced by guns of the army caliber 21 cm.

Characteristics of 20-st 5K S / 34: caliber - 203 mm; trunk length — 12.15 m; gun length - 19.44 m; weight - 86.1 tons; maximum elevation angle - 47; horizontal aiming angle - 360; projectile weight - 112/122-kg; initial speed — 925 m/s; firing range - 36.4 km; rate of fire - 30 rounds per hour.

21st K12 (E)

The firm "Krupp" was given a task for a railway guns of army caliber 210 mm. The gun, which received the designation 21-st K12 (E), had a weight of 302 tons, it was mounted on two platforms (10-axle platform in front, 8-axle platform in the back). In a combat position, the gun fired from a rounded railway track

or from the Ware!s turntable. K12 (E) was the most effective long-range weapon of the Wehrmacht, but after 90-100 shots with shells weighing 107.5 kg, it was necessary to bore
barrel due to wear.

It was planned to build three K12 (E) guns to bombard England across the English Channel, but only two guns were built due to the fact that the Luftwaffe began to use more advanced bombers. By the end of 1940, these two guns were deployed on the French coast and indeed bombarded Dover, Folkestone and partly Kent.

Characteristics of 21-cm K12 (E): caliber - 211 mm; trunk length — 33.3 m; gun length - 41.4 m; weight - 302 tons; maximum elevation angle - 50; horizontal aiming angle - 360; projectile weight - 107.5 kg; initial speed — 1625 m/s; firing range - 115 km; rate of fire - 6 rounds per hour.

24-st Teosiog Vgopo

The Teodog Vgipo gun was a 238 mm caliber naval gun used in the First World War on ships of the UlieⱮBasn class. The cannon was mounted on two four-axle platforms; for firing, high-explosive shells 1./4.1 weighing 151 kg were used, carrying an explosive charge weighing 16.8 kg. Before the war, six such guns were built and 5723 shells were fired at them.

Characteristics of 24-st TNeodog Vgipo: caliber - 238 mm; barrel length - 8.4 m; gun length - 20.7 m; weight - 95 tons; maximum elevation angle - 45; horizontal aiming angle - 360; projectile weight - 150 kg; initial speed - 675 m / s; firing range - 20.2 km; Shooting soon - 15 rounds per hour.

. 28-st Kighe Vgipo The Kigge Vgipo ("Short Bruno") gun of 283% mm caliber was a ZK naval gun. 1/40. For firing, high-explosive projectiles 1./4.1 weighing 240 kg were used, carrying an explosive charge weighing 20.4 kg. gun

relied on two five-axle railway platforms. During the period from 1936 to 1938, 8 guns were built with combat. supply to them in 5230 shells. They were distributed among four batteries (690, 694, 695, 696), each of which had two guns. In March 1945, only four guns remained, of which two needed replacement barrels. Characteristics of 28-st Kigge Vgipo: caliber - 283 mm; barrel length - 11.2 m; gun length - 22.8 m; weight - 129 tons; maximum elevation angle - 45; horizontal aiming angle - 360 "; projectile weight - 240 kg; initial speed - 820 m / s; firing range - 29.5 km; rate of fire - 10 rounds per hour. ha

28-st | apoe Vgipo A

Gapze Vgipo (“Long Bruno”) was a 5K 1./45 naval gun that fired 1/3.6 high-explosive projectiles weighing 302 kg, the weight of the explosive charge was 20.1 kg. This gun with an increased barrel length proved to be much better in operation than China Vgipo, the firing range increased to 36.1 km. Three cannons of this model were built in 1937, and 1472 rounds of ammunition were made for them.

Characteristics of the 28-st Gapve Vito: caliber - 283 mm; barrel length - 12.74 m; gun length - 22.8 m; weight - 123 tons; projectile weight - 302 kg; initial speed - 865 m / s; firing range - 36.1 km.

28-st bsimega Vgipo

Before the war, the Krupp firm manufactured two Zsvuege Vgopo (“Heavy Bruno”) guns that fired shells weighing 118 kg. Both guns were still in service in March 1945; they were in service with the 689th railway battery.

Characteristics of 28-st ÿsihuege Vgipo: caliber - 283 mm; barrel length - 11.93 m; gun length - 22.8 m; weight - 118 tons; maximum elevation angle - 45; horizontal aiming angle — 360“; projectile weight - 284 kg; initial speed - 860 m / s; range - 37.8 km; soon firing - 10 rounds per hour.

28th Mere Vgopo

From 1938 to 1940, the Krupp firm developed the Metse Vgipo (“New Bruno”) gun of 280 mm caliber, in 1940-1942 tg. three guns were built and put into service. The barrel had a length of 58 calibers, the total weight of the gun was 123 tons. The gun was located on two 6-axle platforms. Shooting was carried out with 28-st-Og 39 projectiles weighing 255 kg, the weight of the explosive was 33.4 kg. The maximum firing range of 46.6 km was reached, but this is not

satisfied the customers, so the production of the gun was stopped. All three guns were still in service in March 1945.

Characteristics of the 28-st Metse Vgipo: caliber - 283 mm; barrel length - 16.4 m; gun length - 24.8 m; weight - 150 tons; maximum elevation angle - 50; horizontal aiming angle - 1'; projectile weight - 255 kg; initial speed - 955 m / s; range - 46.6 km; rate of fire - 20 rounds per hour. i

28-st K5 (E)

In 1934-1935. A cannon was developed under the designation 28-st K5 (E), which was put into service in 1940. Shooting was carried out with shells 28-st-Ot 35, which, weighing 255 kg, carried 29.3 kg of explosive. The barrel of the gun was made in four versions, differing in rifling; a new boring of the barrel was carried out after 240-550 shots. The gun was mounted on two 6-axle railway platforms.

A total of 25 K5 (E) guns were built at a cost of 1.25 million Reichsmarks each, these guns accounted for almost half of Germany's railway gun fleet. They were known among the troops under the names ZsShapke Vepa ("Thin Bertha") or | eoro!4. The battery, consisting of one or two K5 (E) guns, was transported to a new position by two separate trains.

In the fall of 1943, the 697th and 713th batteries with Leopolds took part in the shelling of Leningrad. From the end of 1943, due to the increased activity of Soviet aviation and the increased destruction of the German railway network,

It was proposed to transport the K5 as field guns, disassembling them first into sections (barrel, carriage, platforms). Each section was to be transported by two tractors, in this case, the tractors were to be carried out on the basis of the Tiger P tank. However, this plan was never implemented until the end of the war,

During January-February 1944, the K5 (E) gun fired at the beaches of Anzio, inflicting significant damage to the landing allies in equipment and manpower. The Allies tried for a long time to destroy this forest, which they called Ango Appie or An2yu Experess, but to no avail.

. But. The fact is that in case of danger, the gun retreated to a shelter equipped in a railway tunnel laid through a mountain range. During the retreat, the Germans blew up the EU, as the railway tracks were destroyed by the advancing allied forces.

To increase the maximum firing range, a new type of projectile KOT 43311 was developed in Peenemünde. The projectile equipped with a rocket engine weighed 248 kg, the engine turned on 19 seconds after the shot, pushing the projectile further into the stratosphere, the result of this was a range of 86.5 km . Although this was a certain success, the presence of a rocket engine reduced the weight of the explosive in the projectile to 14 kg. Peenemünde also tested a new projectile with wings, weighing 120 kg and designed to be fired from a 310 mm cannon. The initial speed of such a projectile was 1524 m / s, which made it possible to achieve a firing range of 155-160 km.

In March 1945, five K5 (E) guns of 283 mm caliber remained in service, for which there were no more ammunition, as well as two guns bored out to a caliber of 310 mm, for which only 25 shells remained. Three more guns were under repair, although there were only one stem.

Characteristics of 28-st K5 (E): caliber - 283 mm; barrel length - 21.54 m; gun length - 31,ÿ m; weight - 218 tons; maximum elevation angle - 50; horizontal aiming angle - |; weight

projectile - 255 kg; initial speed — 1120 m/s; range - 59 km; rate of fire - 15 rounds per hour.

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38-st poor“

Before the war, a 380 mm 5K S/34 naval cannon was built, which was used on ships of the Vivtpatsk class. The firing was carried out with bieripei-Stapaie 1,/4.5 projectiles weighing 495 kt, carrying 48 kg of explosive. A more powerful projectile, breepvrgapa!e 1./4.6, was also used, weighing 800 kg and carrying 69 kg of explosive. Initially, it was supposed to order seven guns of this type, but due to their high cost (about 5 million Reichsmarks per gun), they limited themselves to purchasing only three guns. At the end of the war, one gun with & shells was in service, and another one was under repair.

Characteristics of 38-st Ber Pei: caliber - 380 mm; barrel length - 19.63 m; gun length - 24 m; weight - 294 tons; projectile weight - 495 kg; initial speed - 1050 m / s; range — 55 km.

80-st Ooga R

The largest cannon in World War II was the 80 cm Dora. Back in 1935, on the instructions of the High Command of the Army (OKN), tests were carried out in order to determine which calibers of artillery would be effective against the fortifications of the Maginot Line. The Krupl firm developed designs for 70 cm, 80 cm and 100 cm guns. When Hitler visited the firm in 1936 and got acquainted with the projects presented to him, he demanded the speedy creation of a super-heavy gun. After that, the specification for the gun was issued with the following characteristics: maximum range 35-45 km, elevation angle 65°, penetration - | m of steel armour, 7 m of concrete and 30 m of solid earth. In 1937, the Ministry of Armaments issued an order to the company: Krupp for three 80-cm guns. The development of the gun was led by E. Muller.

However, the cannon was not completed by the originally planned date (spring 1940), so the invasion of France went without it. The gun was finished with talc a year later, its tests were carried out at the range in Hillersleben from September 10 to October 6, 1941. In November

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The re-gun was installed on a railway platform and transported to the training ground in Rügenwald, where tests were carried out from November 25 to December 5. In total, 8 test shots were fired with shells weighing 7100 kg at a distance of up to 37,210 m.

In January 1942, the 672nd heavy (railroad) artillery battery was formed, which included a single 80-cm gun, the battery was commanded by Colonel R. Bohm. It must be said that the cannon was called “Dora” in the troops, but on June 22, 1942, by order of Hitler, the gun was named $ szhegerg Siÿ{au (“Heavy Gustav”) after the head of the developer G. Krupp.

The 672nd battery included a headquarters, a fire control platoon, a reconnaissance platoon, an observation platoon with infrared equipment, battery crews for gun lifting, maintenance and movement, the personnel numbered 500 people. The battery was assigned construction teams, an anti-aircraft battalion, a team of 20 engineers from Krupp, a smokescreen unit, two Romanian security companies, a military police unit, a squad of patrols with guard dogs and an aviation group from the Luftwaffe, which included a spotter helicopter and cover fighters. Directly during firing, the cannon was served by 350 people, in total there were approximately 3870 people.

The 672nd battery was transported to the Sevastopol region in April 1942. To ensure the possibility of transporting guns by rail, the ygb was dismantled into its main parts, which were transported to

special platforms. Transportation of the cannon required 5 trains with a total length of 1653 m. - ships.

In a combat position, the gun was mounted on eight five-axle carts moving along two parallel railway tracks. The horizontal aiming of the gun was carried out due to the fact that the tracks on the firing position were made in the form of curves

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th radius. The gun was mixed with two diesel locomotives with a capacity of 1000 liters each. With. The fire was fired only strictly parallel to the track, since in the event of a deviation from the axis of the track, the gun would inevitably turn over during firing. The vertical aiming of the gun was carried out with the help of an electric hydraulic drive.

For "Dora" two types of shells were used: concrete-piercing shells for heavy fortifications and high-explosive shells for general bombardment. A concrete-piercing projectile weighed 7.1 ti and had a length of 6.79 m, a high-explosive projectile weighed 4.8 ti and had a length of 8.26 m. One shot took from 19 to 45 minutes, the barrel had a resource of 100 shots. The firing range was from 28 to 47 km.

On June 5, 1942, the first shot from a cannon was fired at Sevastopol. Another 47 shots were fired before June 17, when the ammunition ran out. Of these 48 shells fired, only 10 hit the target with a deviation of up to -60 m. The largest deviation of one of the shells was approximately 740 m. After the capture of Sevastopol by the Germans, 5 more shots were fired, and then the gun was dismantled.

There were plans to use this gun in Leningrad in September 1942, but due to the fact that the Soviet troops continually tried to break the blockade ring, the gun was sent to Rügenwald for repairs. There she was given a new barrel and in March 1943 she was tested by firing 4 shots. Two of these shots were observed by Hitler on 19 March. He was impressed by what he saw, especially by the fact that one of the shells flew 47 km away. General of the Armored Forces Guderian was also present at these shots. Dr. Müller of the Krupp firm, in praising his product, tried to convince Hitler that the gun could even be used to fire at tanks. Hitler then inquired about Guderian's opinion on Müller's statement. Guderian replied simply: “Shoot, of course, you can, but knock them out? Never"

- The second gun "Dora" was almost finished, but the gun team for it was never formed. In April 1945, both guns were blown up by the Germans during their retreat, they were discovered by the Allies in Saxony and Bavaria.

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At the end of the war, Hitler issued an order to finish the third gun. Its caliber was 52 cm with a barrel length of 48 m, the gun was going to be called Gapreg S' am ("Long Gustav"). It was assumed that 1 apveg Siz{au would fire rockets, the same shells were planned for the Dora. They were developed in Peenemünde, the firing range was 100 km. A similar projectile carried 25-30 kg of explosive, but Hitler demanded a more powerful projectile. Therefore, studies were carried out to create a rocket weighing 10 thousand kg, which could carry 1200 kg of explosive and at the same time reach a range of 160 km.

Characteristics of 80 St Pot: caliber - 800 mm; barrel length - 32.48 m; gun length - 43 m; weight - 1350 tons; maximum elevation angle - 53; horizontal firing angle - 0 "; projectile weight - 7.1 t (concrete-piercing) and 4.8 t (high-explosive); initial speed - 720 m / s (concrete-piercing) and 820 m / s (high-explosive); firing range - 37.8 km (concrete-piercing) and 47 km (high-explosive); rate of fire - 1 shot in 19-45 minutes. 45

39. EXPERIMENTAL GUNS

Nosnagiskritre

In 1942, the Ezepuskkehn Koste firm in Wetzlar began developing a project for an ultra-long-range gun of an unusual design under the designation NosEgiskritre (HPP high-pressure pump), in official documents the gun was also referred to as Tassepagiss

- (“Centipede”), Neve ÿ4ezshep (“Hard-working Liz-

`hen"), "V-3" and Epipdeg ("Friend"). The concept used in the development of the gun was to disperse the projectile along the long barrel of the gun in a series of successive explosions. In May 1943, Hitler instructed Speer to speed up the work, since he saw in this gun a fairly cheap means of bombarding London. After that, Kosne issued an assignment to OM#M for the construction of a model of a 20 mm caliber gun. This model was shown to Hitler in September 1943, it made a great impression on him. Taking into account that work on the A4 ballistic missile was suspended due to the massive bombing by the Allied aviation Peenemünde, Hitler ordered the construction of 50 NOR guns at once, without waiting for the completion of the testing of the prototype. At the same time, it was ordered to start building two combat positions for guns on the northern coast of France in the Calais region.

Each position was supposed to be equipped with concrete underground bunkers up to 100 m deep, in which 25 guns were to be mounted. Service

. the position was supposed to be the command of Colonel de Boucher, in which there were 1,100 people. The barrel of a 150 mm caliber gun was made up of 32 intermediate links and had a total length of 124 m; it was installed on an inclined concrete foundation. 3.48 m intermediate link

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It had chambers on both sides for additional charges of gunpowder, the chambers were located at an angle of 90 "to the axis of the barrel. The initial weight of the gun was 62 tons, but as a result of finishing work, it later increased to 76 tons.

For this gun, Vossipr designed high-explosive projectiles 3.165 m long and weighing 140 kg, the projectile carried 25 kg of explosive. When fired, it was supposed to detonate 4.5 kg of the main expelling charge, after the projectile had passed the first intermediate link, both side additional charges weighing 4.7 kg should have exploded, further accelerating the projectile. This process must be repeated over and over as the next links are passed. In this way, they hoped to achieve an initial projectile velocity of 1500 m/s, which resulted in an estimated range of 160 km.

After successful testing of a model gun with a short barrel at the artillery range in Hillersleben on January 18, 1944, tests of a prototype gun with a normal length barrel began. From 21 to 25 March, the Nosndgiskritre gun was demonstrated to the Commission of the Ordnance Department. The tests gave the following results: the initial velocity of the projectile was 1100 m/s, the firing range was 50 km. The final report of the commission stated: “After the elimination of some shortcomings, the tool is ready for use. The shells are completely unusable due to their instability. It turned out that during the development of the projectile, its model was not even tested in a wind tunnel for stability, although the production of projectiles had already begun c. September 1943, and by the end of March 1944 it was planned to deliver 25 thousand shells. On April 6, Speer informed Hitler about the problem with shells, he ordered instead of the 50 planned guns to finish only three guns, and to urgently develop shells of a new design for them. After that, at the end of May, tests of projectiles developed by various companies began. Meanwhile, the imperial science committee sent a letter to Bormann and Hitler's secretary, which explained the reasons for the failures in the development of the NOR and proposed new options for the design of the gun, including options for arranging additional loading chambers at an angle of 45 to the barrel axis.

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By the beginning of September 1944, a decision was made to develop a version of the gun under the designation GVK 15E58. Its barrel consisted of a 150-mm EN18 howitzer barrel and twelve intermediate links of the same caliber with two explosive chambers on the sides of each. The total length of the barrel was 50.01 m, the weight of the gun was 28 tons. The gun fired a 15-sp-brg high-explosive projectile. 4481 weighing 97 kg. The expelling charge contained 5 kg of the main charge and 24 additional charges, totaling 72.8 kg. At an initial velocity of 935 m/s, it was expected to achieve a maximum range of 49,265 m. , as a result of which the projectile accelerated to the calculated initial velocity.

The new gun was being prepared for testing as part of the offensive in the Ardennes. In mid-December, an artillery team of Mogkogatapdo 4eg AgiiNegie-AB L05 consisting of 30 people was prepared, which was attached to an auxiliary unit of 38 people. A position was set up southeast of Trier, where they planned to install four ÿÿ 15ÿ58 guns.

Each gun was mounted at an angle of 34" on a concrete foundation more than half a meter thick. The barrel was attached to the foundation using a load-bearing structure made of wood and steel, the weight of this structure was 21.5 tons. On December 28, 1944, the first battery (1. Vayegie beg Ap. AI.705) was put on alert. Out of a total of 365 shells made for the cannons, 44 shells were delivered to the battery on December 29. At 22.16 on December 30, the first shot was fired at Luxembourg. The muzzle velocity of the projectile was 884 m / s, and the range of the shot is 42.5 km. Before New Year's Eve, 27 more shots were fired.

The second gun opened fire on January 3, 1945. After firing from two guns, by January 5, only 16 shells remained from the prepared ammunition load. Then, on January 10, another 60 shells were delivered, which was enough for three days of firing. Subsequently, the activity of the battery was determined by the amount of ammunition delivered, but by February 22, the shelling had stopped, in total 157 shots were fired.

fishing Due to the lack of ammunition, guns No. 3 and No. 4 did not enter the battle at all. The effect of shelling was minimal, it corresponded approximately to the effect of shelling with taubits of the same caliber, the dispersion during firing was up to 5 km. It was supposed to use guns against Antwerp, but for this it was necessary to increase the total weight of the expelling charge to 120 kg, which gave an increase in the firing range to 65 km. However, the end of the war interrupted all work on fine-tuning the GVK. 15238 and according to the main variant Noshygiskritre. At the end of the war, the Americans seized one gun and took it to the USA.

Characteristics Noshygiskritre: caliber - 150 mm; length - up to 140 m; projectile weight - 140 kg; estimated range — 165 km.

The Speer Ministry had a research institution based near Lofer, Austria, in which Dr. Richard Wallauschek attempted to use sound as a weapon. His last and best project, called ÿÿÿÿÿÿÿÿÿÿ (“Sound Cannon”), was a system of a parabolic reflector with a diameter of 3.2 m, a small diameter counter reflector and a combustion chamber passing through the top of the counter reflector. There were two coaxial nozzles inside the chamber; methane was supplied through the outer nozzle, and oxygen was supplied through the central nozzle. The sound waves formed during the combustion of the gas mixture were collected by the main reflector and reflected in the required direction. According to calculations, the maximum sound intensity of the gun should have an opening angle of 65°, and at a distance of 60 m along its axis, the sound pressure could reach 1000 microbars. It was assumed that the impact of such pressure on a person with a certain frequency in treatment of 30-40 seconds could lead to irreversible changes in his body, up to death. At long distances, perhaps up to 300 m, the sound effect was not lethal,

but when irradiating a person for a long period of time, it was able to cripple him. At the same time, vision was damaged, and the person,

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exposed to sound, perceived point sources of light in the form of luminous lines. However, there is no information about the use of the sonic gun.

Gubi Beisapope

The Austrian scientist Dr. Zippermeyer, who also worked in Lofer, was engaged in research in the field of creating miniature tornado-type vortices in the air, which were supposed to have a catastrophic effect on flying aircraft.), which worked on compressed air, did not lead to success.

Then Zippermeyer suggested creating vortices in a new way. The essence of this method was as follows. The projectile was filled with finely dispersed coal powder, inside of which there was a small charge of coarsely dispersed powder. After the initiation of the explosion, a cloud was formed from a mixture of coal dust and gunpowder, moving forward with rotation around its axis and resembling a small tornado. The burning gunpowder acted on the coal dust in the air as an igniter, resulting in a volumetric explosion of a vortex cloud.

Of course, to create the tornado effect, it was necessary to provide a certain combination of projectile flight speed (several hundred meters per second), projectile rotation speed around its axis, initiating charge explosion force, and burning time. Zippermeyer used a large caliber mortar for his experiments. On the further development of this work

nothing is known.

M/ipackapope

One of the firms in Stuttgart was working at the end of the war on the creation of an anti-aircraft gun called Mipikapope ("Wind Cannon"). The idea was that the gun was supposed to fire pulsed jets of gas formed during the explosion of an oxygen-hydrogen mixture. It was assumed that a pulsed jet hitting a flying enemy aircraft would have a destabilizing effect on it (for example, turn it over), after which the aircraft should lose control and crash.

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The made model of the gun was tested at the training ground in Hillersleben. According to some data, from a cannon at a distance of 200 m it was possible to damage boards 25 mm thick. At the end of the war, this gun model was captured by the Americans and taken to the United States.

Soppepkapope

At the end of the war, the Germans created the Soppen-Kapope (“Solar Cannon”) cannon, based on the use of the mirror of Archimedes. The gun was a large-diameter mirror mounted on a frame. It was assumed that in clear weather the mirror would be able to concentrate the energy of solar radiation on a flying enemy aircraft, which would damage it. A prototype of this weapon fell into the hands of the Americans. Nothing is known about the further fate of this weapon.

Eiekigokapope

At the instrument-making firm SeizesNay, which belonged to the arms department, a type of weapon was developed in which the projectile was accelerated due to

electromagnetic field. During the development of the cannon under the designation Nekiokapopé ("Electropush ÿa"), the results obtained by the French during the First World War were used.

The barrel of the gun was a linear motor; it consisted of a set of electromagnets following one after another. When fired, the projectile was accelerated by the electromagnetic field of each successive link. In October 1944, during tests, the initial projectile velocity of 960 m / s was reached at a current strength of 21 thousand amperes.

The development of the 40-mm anti-aircraft gun 4-st-Nak was planned, the shells for which were developed in Peenemünde. They hoped, with a sufficiently long gun barrel, to achieve an initial velocity of 2500 m / s. Calculations showed that an entire power plant was needed for the operation of an anti-aircraft battery of such guns. generating a current of 1.5 million amperes and a voltage of 1300 volts. Until the end of the war, only three experimental guns with a barrel length of 2 m were built.

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40. BATTLE UNDERGROUND FACILITY

Mibdaga-5sMatde

In 1934, a project was developed for an underground combat weapon called Miygaga-5s Iapre ("Midgard Serpent"). The group of engineer Ritter working on the project used this name from ancient Germanic mythology (the huge serpent Midgard, living in the oceans, with which the god of thunder Thor fought), probably in order to arouse special interest in Hitler.

When designing, it was assumed that a vehicle could move on the ground, underground and even under water at a depth of up to 100 m. It had to carry large quantities of explosives, which were supposed to be installed under the fortifications of the Maginot Line or in enemy harbors. The vehicle, the first developments of which date back to the summer of 1934, consisted of a large number of cell-compartments connected together. Each section was 6 m long, 6.8 m wide and 3.5 m high. Depending on the task, the minimum length of such a train could be 399 m, the maximum length 524 m.

Ahead was a large drilling head, the same as those used in the mining industry for underground work, on which four drills with a diameter of 1.5 m were located. Nine electric motors with a total capacity of about 9 thousand liters, s were provided to drive the head. In addition, there were three more sets of drills, which were replaced depending on

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rock properties. The running gear of the train was served by 14 electric motors with a total capacity of 19,800 hp. s., the electric current for the engines was generated with the help of four diesel electric generators with a capacity of 10 thousand liters. s., for which there were fuel tanks with a capacity of 960 m3. Movement under water was carried out with the help of twelve pairs of rudders and additional twelve engines with a total capacity of 3 thousand liters. With.

Armament included 1,000 mines with 250 kg of explosives each, 100 small charges of 10 kg of explosives, and 12 coaxial MO machine guns. The vehicle weighed 60 thousand tons, the crew was 30 people. On board were: an electric kitchen, a bedroom with 20 beds, three repair shops, several periscopes, a radio transmitter, and 580 large compressed air tanks. Later, additional underground facilities were developed for Midgarl — ÿÿÿÿÿÿ, ÿ)ÿ!-pÿg, ÿÿbegisÿ and ÿÿÿÿÿ.

Raymg (in the Germanic sagas - a dragon) was an underground torpedo 6 m long. AIBegisÿ was a reconnaissance torpedo that carried microphones and a periscope. With the help of a small vehicle Gaogip, the crew of "Midgard" could leave their train and

, walk from underground to the surface. The design parameters of the Midgard were fantastic — the maximum speed under water was 30 km/h, the speed of penetration in rocky ground was 2 km/h, and in soft ground even 10 km/h.

Ritter, in an explanatory note to the project, proposed the construction of 20 Midgards worth 30 million Reichsmarks each, this was necessary to implement a plan to attack strategic targets in Belgium and France, as well as to mine British ports. According to the proposed plan, 15 enemy ports were to be blown up three hours after the start of hostilities. Demoralized by these events, the population of the as yet unoccupied areas in a panic stopped supporting their government or turned to civil war. The author called "Midgard" a weapon of mass destruction, which will lead to the fact that "desperate

All the people will face a choice - perish or stay alive. Ritter's project caused a lot of criticism from specialists, for example, Colonel Wietinghoff, head of department in the Ministry of Armaments, wrote the following remark on the project folder: “The proposed design is not new in itself, but any calculation justification in no documentation." Therefore, on February 28, 1935, the project was returned to engineer Ritter.

Whether Ritter finalized his project or not, there is no information on this subject in the literature. However, after the end of the war in the area of Koenigsberg, adits of unknown purpose were found, and near them the remains of an exploded device of unknown design. Recently, the Russian mass media began to appear reports of attempts to develop such an underground facility in the USSR. From these reports it follows that in the fall of 1964 an underground cruiser called the “Battle Mole” was tested, but neither specific characteristics nor descriptions of the design of this vehicle are given.

41. NUCLEAR RESEARCH

In December 1938, the German physicist Professor Otto Hahn, together with his collaborator Strassmann, succeeded in discovering the process of uranium fission. Some time later, the results of the research were handed over by Lisa Meitner, a collaborator of Hahn, to the Danish professor Niels Bohr. At a conference on theoretical physics held on January 26, 1939, in Washington, Bohr delivered a report in which he reported on the work of German scientists. After that, intensive research began in the USA, as a result of which, as it was announced, Enrico Fermi of Columbia University discovered a new physical process - the splitting of uranium atoms. In March of the same year, an article by the French physicists Joliot-Curie, Halban, and Kovarsky was published in the journal Maishre, in which they presented the results of their experiments on the implementation of a nuclear reaction.

In mid-April 1939, German professor William Hanle proposed a scheme for a “thermal engine” (nuclear reactor) that uses the energy released during the fission of uranium. This proposal was discussed on April 29 at a meeting of the Research Council of the Reich Ministry of Education, at which a working group of scientists was formed under the leadership of Professor Abraham Esau. The main task of this group was the development of a nuclear reactor, and its first action was to ban the export of any uranium compounds from Germany. In addition, the Germans urgently purchased large quantities of uranium ore from the Belgian firm Opon Mipegue, which mined it in the Congo.

Around the same time, Professor Paul Harteck and Dr. Wilhelm Groth wrote a letter to General Becker, head of the armaments department of the army. In the letter, they reported that new discoveries in the field of nuclear physics would make it possible to create explosives of enormous power. Referring to the fact that American, French and British scientists are working on nuclear physics, Harteck and Groth suggested that appropriate research be started. The answer was the immediate creation under the auspices of the Ministry of War of a group of scientists (about 50 people), who were ordered to study the possibilities of using atomic energy for military purposes. Priority was given to the development of technology for producing the uranium-235 isotope and the creation of technological equipment, research on the choice of moderators for the reactor, the development of design options for reactors, etc. The leadership of the group was entrusted to Dr. Kurt Diebner.

Professor Heisenberg, who was entrusted with the

. to conduct theoretical studies of the processes of uranium fission, at the end of 1939 he came to the conclusion that the use of graphite as a moderator for a reactor is not as effective as the use of heavy water (0.0). In Germany, heavy water was produced only in small quantities. The only factory in Europe that produced ce in large quantities was the Norwegian factory Nötsk-Nuigo in Rjukan. At the beginning of 1940, 185 kg of heavy water were stored there, which the French bought with the help of the trade attache in Oslo and transported it to Paris, and from there in May 1940, before the Germans occupied France, to London. After the occupation of Norway, the Mötsk-Nuigo plant began to work entirely for the Germans.

At a conference organized by the Scientific Research Council on February 26, 1942, the interim results of the work on the "uranium project" of the two working groups were considered. It was noted that 10 to 100 kg of uranium would probably be needed to build a bomb, and warships could be equipped with uranium power generators; submarines and large tanks. In June of the same year, Reichsmarschall G. Goering headed the work on the “uranium project”, and appointed Professor Esau as his authorized representative.

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However, work progressed with difficulty. Although the production of heavy water in Rjukan under German control was constantly growing (in 1941 - 1500 kg, and in 1942 - 5 thousand kg), the plant was repeatedly put out of action by the Norwegian resistance groups or British sabotage groups . In June 1943, a technical conference chaired by the Minister of Armaments, Speer, decided that further work on the atomic bomb should be suspended and only work on the atomic reactor should be advanced. However, failures continued to haunt the “hooray new project” - on November 16, 1943, the Mogzk-NuChgo plant was bombed during a raid by 176 Anglo-American bombers. During the bombing, 22 Norwegian employees were killed, and the destruction of equipment was such that the production of heavy water stopped.

It was necessary to create the production of heavy water in Germany. We urgently developed a project for a workshop for the production of heavy water, which was supposed to be built at the Geshpa-Mesche company. The construction cost was estimated at 25 million Reichsmarks, and 50 tons of brown coal per hour were required to generate the required amount of electricity. However, in the conditions of the collapsing German economy, the construction of such a workshop turned out to be an unrealistic task.

In December 1943, Goering relieved Esau of his duties as commissioner for the "uranium project", appointing instead Professor Gerlach, who until that time had worked on orders from the Kriegsmarine. At the beginning of the next year, it was decided to remove the remaining reserves of heavy water from Ryukan in the amount of 613 kg. Despite the precautions taken by the Germans, the Norwegian Resistance fighters managed to blow up a sea ferry carrying 39 containers of heavy water. The Germans managed to save only four containers with 121 kg of heavy water. The surviving containers were delivered to Germany, but the concentration of heavy water in them turned out to be low, which was not suitable for a uranium reactor.

Professor Heisenberg stated at the end of 1943 that he did not see any possibility of producing atomic bombs in Germany. Then the Ordnance Department made another attempt, this time to develop a thermonuclear bomb. A team of specialists led by Dr. Dibner

developed a diagram of the device, which was a ball stuffed with a conventional explosive, inside of which there was a small ball of radioactive material.

At the end of May 1944, Gerlach reported to the command that the first reactor with a critical mass of nuclear fuel would be built in the near future. In July, a place was chosen for the installation of the reactor - in a cave near the village of Haigerloch, not far from the Swiss border. After the cave had been properly prepared and equipped, at the end of February 1945, the reactor V USh, evacuated from Berlin, arrived in Haigerloch. It was a light metal cylinder with a graphite reflector weighing 10 tons located inside. 1.5 tons of heavy water were poured into the core and 664 uranium cubes with a total weight of 1525 kg were installed. On March 23, Professor Gerlach called from Heiterloch in Berlium: "The reactor is working!" But it was premature - the German uranium reactor B UIN failed to reach the critical point. After recalculation, it turned out that the reactor load should be increased by almost 50%. It was possible to get another 750 kg of uranium from the stocks of various research institutions in Germany, but there was nowhere else to get another 750 kg of heavy water.

On April 23, Haigerloch was occupied by the 1279th reconnaissance battalion of American troops, although he was in the zone of responsibility of the French. The next day, the Americans discovered the uranium reactor, after which they dismantled and removed all the equipment, and blew up the cave. Soon, in the town of Hechingen, located fifteen kilometers from Haigerloch, they found cubes of uranium buried in the ground, as well as gas canisters filled with heavy water.

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